COAL AGE

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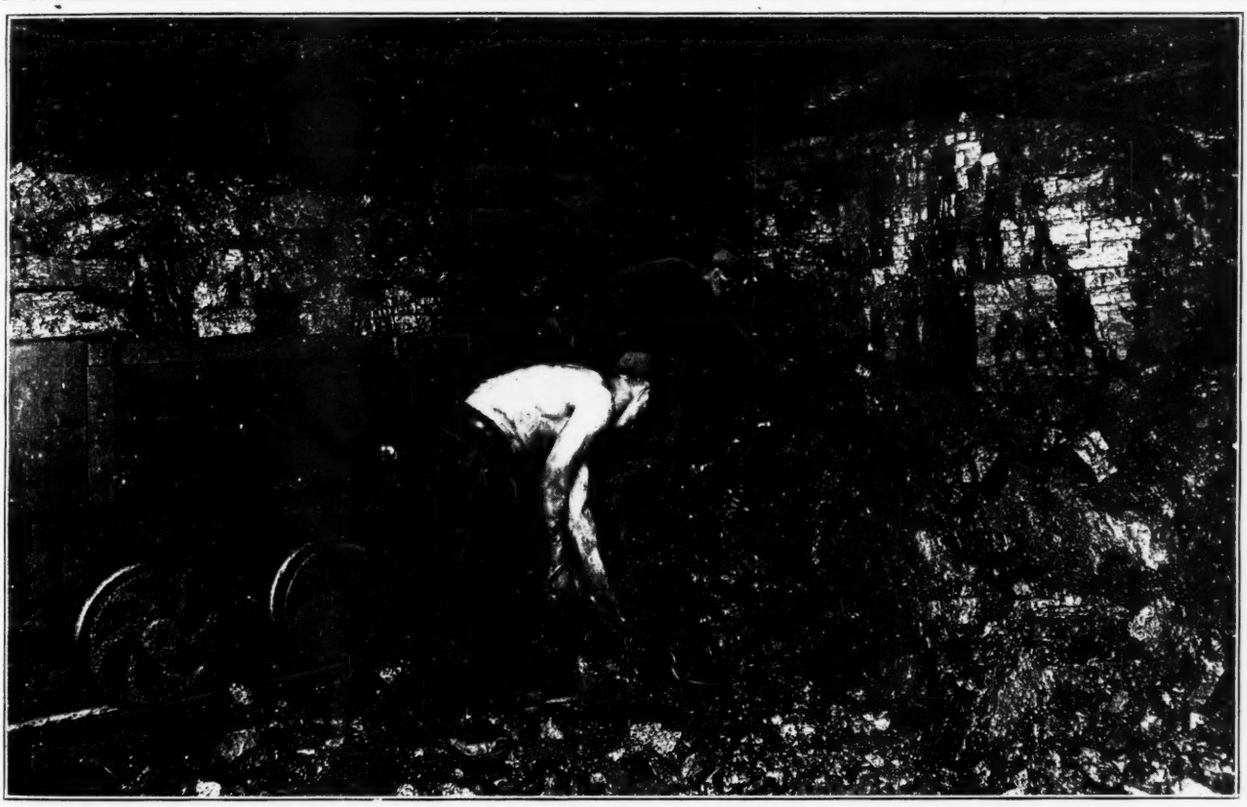


Every scoop means a beltful of bullets Every carful of coal means a shell

Straight Stuff

Written Expressly for Coal Age

By Berton Braley

Every scoop means a beltful of bullets,
Every carful of coal means a shell
That'll shoot from our guns to abolish the Huns
And set 'em to running pell-mell.
My drill barks a lot like machine guns,
Re-echoing here in the room,
And the dynamite's sound when I set off a round
Is the heavy artillery's boom!

So I think of myself as a soldier
That's working down here in a mine,
And I toil heart and soul to be bringing up coal
For the sake of my brothers in line.

And whenever I'm feeling like loafing,
I say to myself, "You big slob,
While the boys over there all are doing their share,
I guess *you* can stick to *your* job!"

Yes, we're all either helping or hurting,
According to which way we act,
When you slack or you quit you're not doing your bit
And you can't get away from that fact.
Remember you're part of the army,
And your record in tonnage will tell,
Every scoop means a beltful of bullets,
Every carful of coal means a shell!

IDEAS AND SUGGESTIONS

Salvaging Buried Rails

BY ISAAC HYDE
Drumheller, Alta.

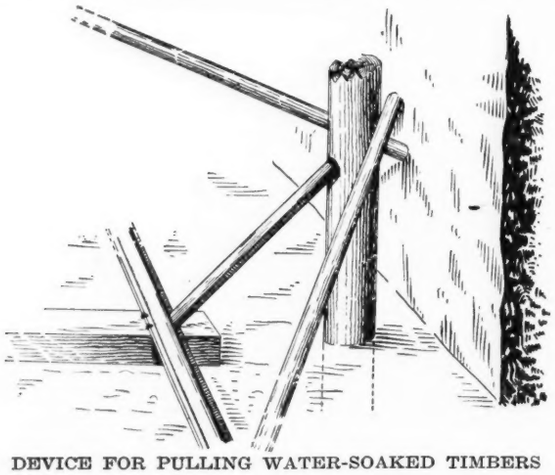
I was sent to pull out the turn rails from a pillar working which had caved, burying the rails (15 ft. long) to within 6 in. of their outer ends. I cleared the ends of the rails and fastened to each end a strong chain. I then used a Sylvester prop puller and with the aid of two men sprung the rails slightly from the spikes.

When the rails were somewhat loose, in order to facilitate getting the rails from under the cave I attached the chain to a loaded car. Starting the car as near the cave as possible, three men gave it such momentum that when the slack was taken up the pull was sufficient to draw the rail from under the cave. This saved much time over the slow process of using the Sylvester puller for the whole operation.

Pulling Heavy Timbers

BY WILLIAM LAWTON
Seattle, Wash.

While there is nothing new in the idea here described and illustrated, of a device used in removing heavy water-soaked timber sunk deep in the bottom, it may be of interest to some readers. Miners and others who have had experience in taking out old posts from the side of roadways in mines where the ground is wet and sticky know how difficult the task is when the timber has been forced some distance into the bottom.



DEVICE FOR PULLING WATER-SOAKED TIMBERS

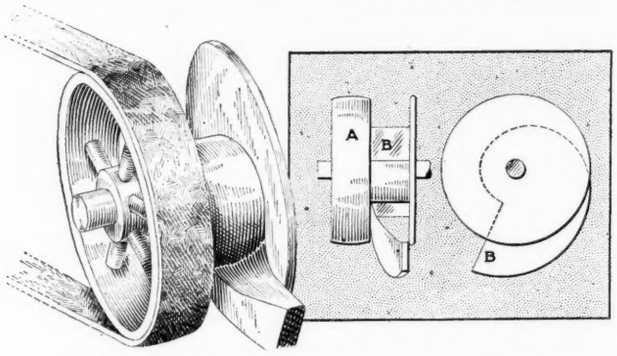
In the method here described a short brace or shore is placed against the timber that is to be removed and is prevented from slipping by the top being inserted in a notch cut in the timber for that purpose. The bottom of this brace should be secured against the rail or any other object that will give it a firm hold. Care must be taken that the brace or lifting device engages the timber at the proper angle to secure the maximum lift.

Suitable levers are now applied between the side or wall and the timber to be removed, and if the post is sunk deep the dirt in front of it should be loosened or removed to allow free movement when leverage is applied. This method is satisfactory in saving time and labor if no better means is at hand.

Replacing a Belt

BY J. A. CAHEN
Brooklyn, N. Y.

The accompanying illustration shows a device for replacing a belt that has slipped off a pulley. *A* is the pulley and *B* the device for replacing the belt. This device has a curved projection extending the full width of the face and at one end comes even with the perimeter of the pulley *A*. It then tapers laterally toward the outside edge of the device.



SCHEME TO REPLACE BELT ON PULLEY

As a result the belt will quickly pull upon the broad end and cause the device to rotate. The belt runs up the curved projection and lifts clear of the pulley *A*, but on account of the taper of the projection the belt finally has contact with the projection on the edge only, tips over to the other side, and as a result comes in contact with the face of the pulley. Because it is under tension and adjusts itself so as to be in line with the pulley at its other end, the belt now naturally and smoothly runs onto the face of the pulley.

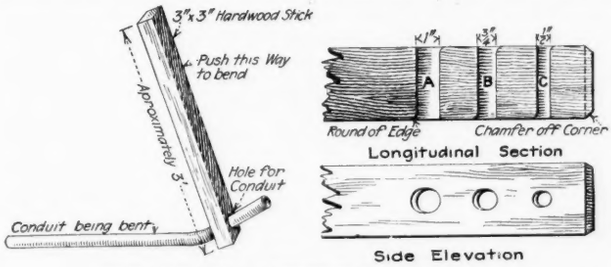
"Hickey" for Bending Pipe or Conduit

A pipe or conduit bender of a simple type is shown in the accompanying illustration. This hand bender (which is known as a "hickey") is really a sort of lever. A tool of this design is not to be compared with a metal one for continuous operation but can, particularly for ½-in. or ¾-in. pipe, be made to do good duty, especially in an emergency.

The bender consists of a 3 x 3-in. hardwood stick (hickory is excellent) about 3 ft. or 3 ft. 6 in. long, having holes or slots bored in one end wherein the

tube to be bent may be engaged. In using this device a portion of the tube is held to the floor by the operator, who stands on it, and then by using the hickey as a lever the conduit which is engaged in its lower end is bent by main force into the required form.

If only ½-in. conduit is to be bent, only one hole and that only slightly larger than enough to accommodate



DETAILS OF A SIMPLE PIPE BENDER

the ½-in. pipe is necessary. If more than one size of tube is to be bent, holes of different diameters should be bored, as suggested. It is well to round off the opposite sides of the holes on opposite faces as shown, to prevent kinking of the pipe being bent.

Heavy Towing with Motor Truck

The use of the motor truck has reached almost every industry. Some coal operators have been somewhat skeptical of its utility, but nevertheless many of these machines are being employed for heavy hauling in connection with coal mines.

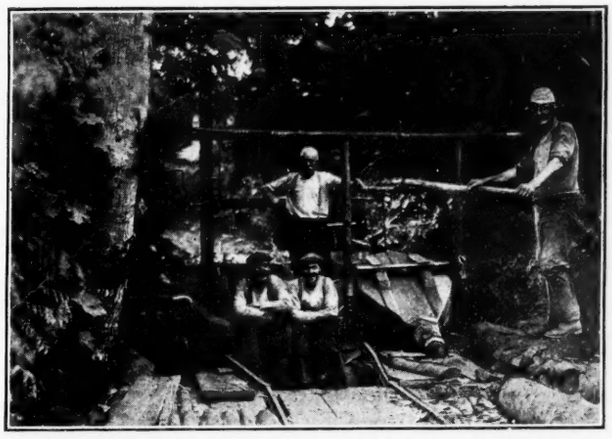
The accompanying illustration shows a heavy four-wheel-drive motor truck, owned and operated by the Lehigh Coal and Navigation Co., towing an ordinary 12-ton locomotive upon a specially constructed wagon. The locomotive was transferred from one colliery to another about 5 miles away. It was necessary to climb and descend several fairly steep grades, yet the trip was accomplished without mishap.

In order to prevent the trailer or wagon with its load from running backward down hill should it break away on a grade, the method of automatic chocking shown in the illustration was employed. For this purpose a railroad tie was chained so as to drag crosswise of the road immediately behind the rear trailer wheels. So long as the trailer moved forward the tie interfered with nothing; but as soon as a retrograde movement started the tie was in position to immediately block or chock the wheels.

An Emergency Ventilator

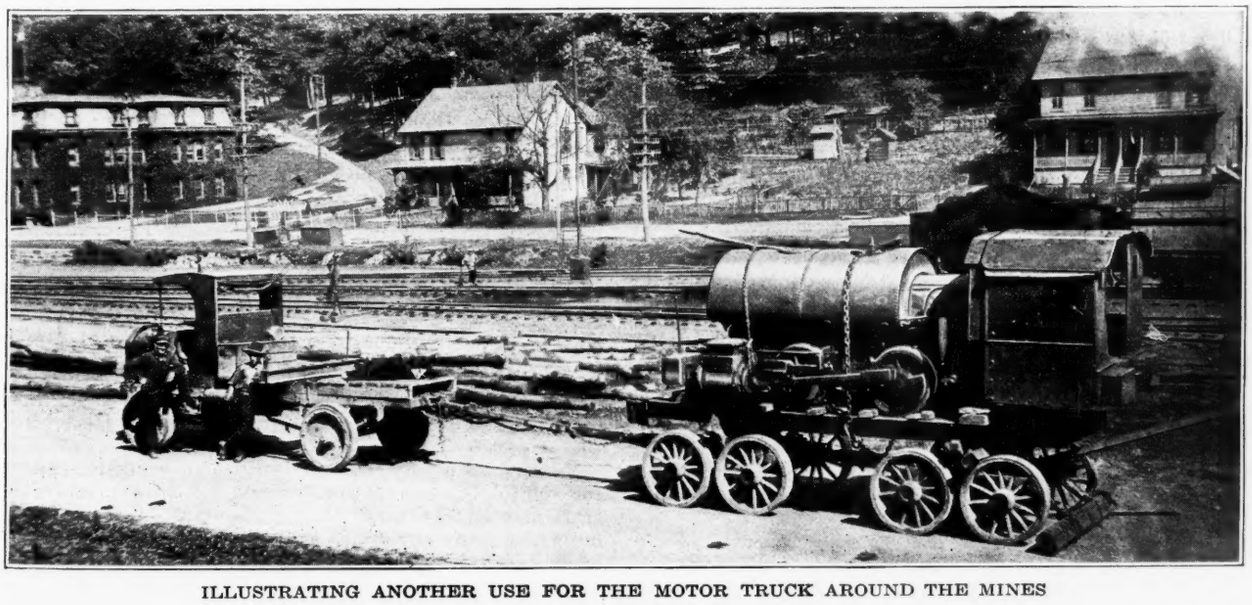
BY J. W. JEMISON
Nanaimo, B. C.

The accompanying photograph shows some workmen about to enter the Chase River slope of the Canadian-Western Fuel Co., of Nanaimo, B. C., which is situated about 2 miles from the company's No. 1 shaft. This slope has been closed for over 30 years. It is believed, however, that much recoverable coal exists in these old workings, and the present owners are sufficiently enterprising to attempt its recovery. It will be noticed that



BLACKSMITH'S BELLOWS SUPPLIES AIR TO WORKINGS

an ordinary blacksmith's bellows is being pressed into service to supply air to the men down the slope. This bellows is connected to a 4-in. wood pipe, which extends down the slope to the face. This scheme, crude though it may seem, filled the requirements adequately. It will doubtless be replaced whenever it becomes necessary with a multiblade fan or other modern mine ventilator.



ILLUSTRATING ANOTHER USE FOR THE MOTOR TRUCK AROUND THE MINES

Concrete Coal Barges

By J. F. SPRINGER
New York City

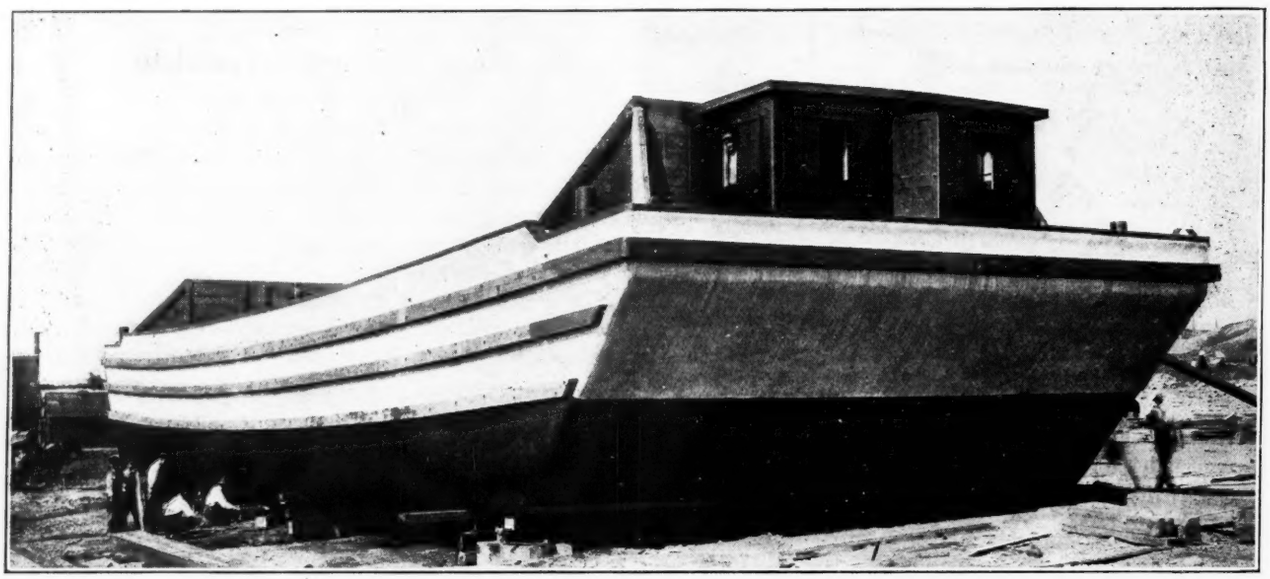


FIG. 1. A CONCRETE BARGE ON THE RIVER BANK READY FOR LAUNCHING

THE concrete boat has come. And, I rather think, it has come to stay. The great war has made it difficult and expensive to secure steel plate and timber. Thus it is no wonder that men have turned to reinforced concrete as a possible construction material, from which they might build both big and little vessels. The Norwegians, the French, the Italians, the Spanish, the English, the Canadians have all given expression to their belief in this material. So also have Americans.

As early as 1849 a reinforced-concrete boat was constructed at Miravel in France. It was nothing more than a modest rowboat. In 1917—nearly three-score-and-ten years later—this boat was said to be still in good condition. The builder was M. Lambot. Another French instance is of uncertain date, but occurred probably soon after the Spanish-American War of 1898 This was the construction of a barge 50 ft. long and 13 ft. wide. It was built for use in dredging builders' ballast, so that curved lines were unnecessary. The depth was made about 3 ft. 4 in. and a slope given fore and aft. Aside from these slopes, it appears to have been almost a simple box. "The initial cost was much less than for a steel or wooden vessel, and the expenditure for upkeep has been practically nil."

I understand that the Italians have been using reinforced concrete in coal barge or similar construction and that their experience goes back quite a number of years. An example of Italy's faith in reinforced concrete for boat construction is a coal barge built in 1906. Its capacity is 150 tons. The length is 52 ft. 6 in., the width 24 ft. 3 in., and the depth 9 ft. 10 in. In 1917, this barge was said to have given good satisfaction and that it had been constantly in service.

The Norwegians have a 200-ton motor-driven reinforced-concrete vessel in coastwise traffic. Her power unit is an 80-hp. oil engine, sufficient to drive her at 7½ knots per hour. This is the "Namsenfjord." The concern which built this boat has constructed many reinforced-concrete vessels, one at least being a lightship for the Norwegian Government. The "Namsenfjord" is 84 ft. long, 20 ft. wide and 11 ft. 6 in. deep. Her builders have contracted for an ore-carrying vessel to have a capacity of 4000 tons.

The French are going in heavily for the construction of the smaller-sized vessels of reinforced concrete. These are for coastwise and inland service. But the chief example of solid confidence in reinforced concrete for vessel construction is to be found at home. The "Faith," launched this year at San Francisco, is a 5000-ton vessel. She has already had her trial trip in San Francisco Bay over a measured course and developed a speed of 10½ knots per hour. The trial trip was about 40 miles in length, and made it clear that the "Faith" was going to be a manageable ship and that but little vibration was to be expected. The United States Government, since her launching and try-out, has contracted for forty 7500-ton concrete vessels.

It looks as though reinforced concrete were about to secure enormous recognition as a suitable shipbuilding material. And yet, objections have been raised to it. This is, of course, nothing more than history repeating itself. It would seem as if no considerable deviation from a beaten track could be made without an accompaniment of dead marches and dirges. In the February issue of *International Marine Engineering*, Prof. B. A. Everett, who is understood to hold the chair of Marine Engineering in the Post-Graduate Department of the U. S. Naval Academy, expresses himself doubtfully as to vessels of more than 250 ft. in length. He says:

> To sum up briefly, we are justified in expecting success for reinforced-concrete construction for barges, still-water craft and perhaps small ocean-going craft of simple form, but are entirely unjustified at the present time in expecting large ocean-going craft to be successful, and should not be led astray by undue optimism.

Professor Everett seems to fear that water, particularly salt water, will reach the reinforcement and effect corrosion and that this expanding will rupture the enveloping concrete. This is really a vital matter and not to be dealt with in a trivial manner—it is not easy to see, however, why it should not be a fatal objection to "small ocean-going craft," the "simple form" affording no protection against the penetration of sea water.

The question itself is a real one, especially in connection with coal-carrying craft used along the coast and in tidewater harbors. Concrete boats and barges for carrying coal on such inland waterways as the Great Lakes, the New York Barge Canal, the Ohio-Mississippi route, the Warrior-Tombigbee-Alabama route, etc., will doubtless come into use. We are also to expect them in service along the Atlantic coast between such southern harbors as Hampton Roads and Baltimore and such northern destinations as Providence and Boston, also on the Pacific coast between San Francisco and points to the north. Cuba and the Panama Canal may represent other points to which coal may be sent by means of the concrete vessel.

If salt water is going to penetrate to and corrode the reinforcement and thus bring about physical rupture, this should be known. But I am afraid, however, that an unfortunate error has been made in this connection. Profound differences can be made in reinforced concrete by variations in the character of the constituent materials and by variations in the proportions used. Naturally, some concretes are bad and subject to almost anything. That there are many examples of disintegrated and ruptured concrete, the disintegration and rupture being due directly or indirectly to salt water, might perhaps be acquiesced in pretty generally by concrete experts.

The unreliability of external waterproofing is admitted. This has no reference, however, to integral waterproofing—that is, to waterproofing which is incorporated into the concrete when it is mixed and in this way made an integral part of its mass.

But let us look at the matter broadly. There are thousands and thousands of linear feet of reinforced-concrete piling, struts and the like standing in salt water. Some of this has been so situated for years.

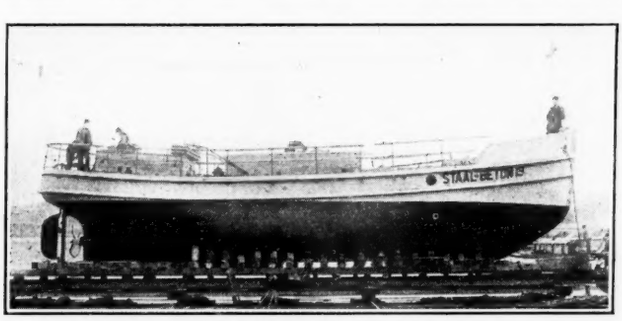


FIG. 2. CONCRETE MOTOR BOAT ON THE WAYS

Hard-headed people have been responsible for a good deal of this construction.

Many such piles were put down not so long ago in the harbor of Halifax. A similar statement may be made in connection with the harbor of Havana. These piles were put in place with the expectation of perpetual exposure to the action of sea water. If salt water is going to penetrate to the reinforcement and the reinforcement is going to corrode, then such construction should soon manifest vertical cracks and this condition should soon be followed by disintegration and collapse. A considerable proportion of the tidewater harbors all over the world contain reinforced-concrete construction of some type or other, and some of it has been in place a good while.

In Europe concrete has been successfully employed for half a century in the construction of structures

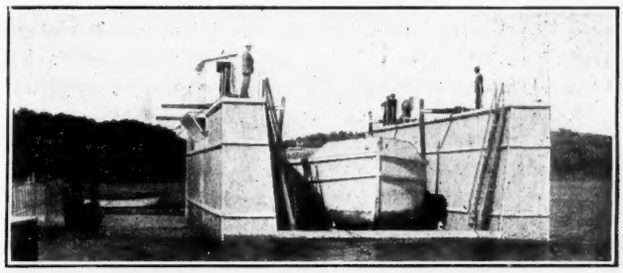


FIG. 3. A CONCRETE VESSEL IN DRY DOCK

exposed to the action of sea water. English engineers for a score of years have been building reinforced-concrete docks. At Liverpool, there has been concrete used in connection with dock construction since 1872. William Cleaver, writing of the concrete docks of the Port Talbot Dock Co., has been quoted as saying: "While reinforced concrete requires extreme care, both in the choice of material and in the supervision of the workmanship, the results justify the extensive adoption of the material for dock work."

In Holland, V. de Blocq van Kuffeler has, it seems, been responsible for reinforced-concrete construction destined for exposure to salt-water action. He is quoted as explaining in the following manner how to get satisfactory results: "A suitable mixture, very carefully manufactured, the use of a good brand of cement with trass, and setting in a moist atmosphere, are the most efficient means of insuring the preservation of reinforced concrete in sea water."

Here the integral waterproofing is trass. This is a variety of volcanic tufa found on the banks of the Rhine as it nears the sea.

C. S. Meik, a British concrete engineer, is cited by Mr. Taft as stating that the deterioration of the reinforcement in reinforced concrete by the action of salt water is negligible. In fact, Mr. Meik refers to an instance at Southampton, England. "The exposed steelwork on a pile end that had been in the sea for eight years was much corroded," but the bars in the body of the concrete were found, when the pile was opened up, to be entirely free from rust. They were pronounced to be as fresh as the day they were put in. Mr. Taft continues: "In connection with the building of some of the earlier concrete dock structures at Southampton, it appears that parts or the whole of piles not used were allowed to remain on the beach or shore, exposed to sea water, for some seven years. At the end of this period, the exposed steel had been badly rusted and deteriorated, whereas the part which was imbedded in concrete was found to be in fine condition, practically as good as the day it was placed in the concrete."

Enough instances of the permanence of waterproofed reinforced concrete can be found to warrant the expectation that it is possible to construct a reinforced-concrete

hull in which the reinforcement will be adequately protected from the action of sea water. It is to be borne in mind, however, that just any concrete will not do. The salient consideration in such construction might be enumerated as follows: (1) It must be rich in some high-grade Portland cement or its equivalent; (2) the coarse aggregate must be practically impervious; (3) it must be free from particles of clay, loam and the like; (4) the proportions of the several ingredients must be such as to insure their utmost consolidation; (5) the highest class of integral waterproofing should be incorporated into the mixture; (6) the mixing and placing should be absolutely controlled by experts.

I may illustrate the point as to the richness of the concrete by citing the material used in the hull of the "Faith." This concrete was specified to conform to the formula, 1 : 1½ : 2. Here we have a total of only 3½ parts of aggregate to 1 part of cement. This means a concrete that is not merely rich—it is one that is extraordinarily rich.

Item 4, as mentioned above, may also be illustrated by this specification. It is essential to an impervious concrete that all voids be filled. The only thing to fill the voids in the sand is the cement (or cement and water). Naturally, then, the ratio must be such that there will be no interstices. It is not enough to ascertain the volume of the sand voids and then provide just that much neat cement. For this to bring about success, the mixing would have to be perfect. There must be a generous excess to make good the imperfections in mixing. In the present case, the ratio was taken as 1 : 1½. This means that the sand was given cement to the extent of 67 per cent. of its own volume. Probably, the actual voids were not in excess of 40 to 50 per cent. If so, cement enough, and at least one-third over, was made available.

Similarly, with the voids in the rock aggregate. The only thing available to fill them is the cement mortar. Assuming—what is not quite the exact truth—that the relative amount of cement mortar is given by adding the first two figures in the formula, we have the ratio 2½ : 2 as expressive of the relation between cement mortar and rock aggregate. Probably, here again, the voids in the rock were not in excess of 50 per cent. of its own gross bulk. The specification required, nevertheless, that mortar be supplied in amount equal to 2.5 times the probable volume of voids.

As to item 2, it is fairly evident, upon a little consideration, that absolutely solid concrete cannot be made with course aggregate that lacks solidity. Item 3 requires the absence of all foreign material itself incapable of consolidation into a mass of high cohesiveness.

The integral waterproofing required by item 5 may be an artificial compound or a natural one. It must, however, fill all minute voids, and effect an impervious consolidation. Trass has already been mentioned for this purpose.

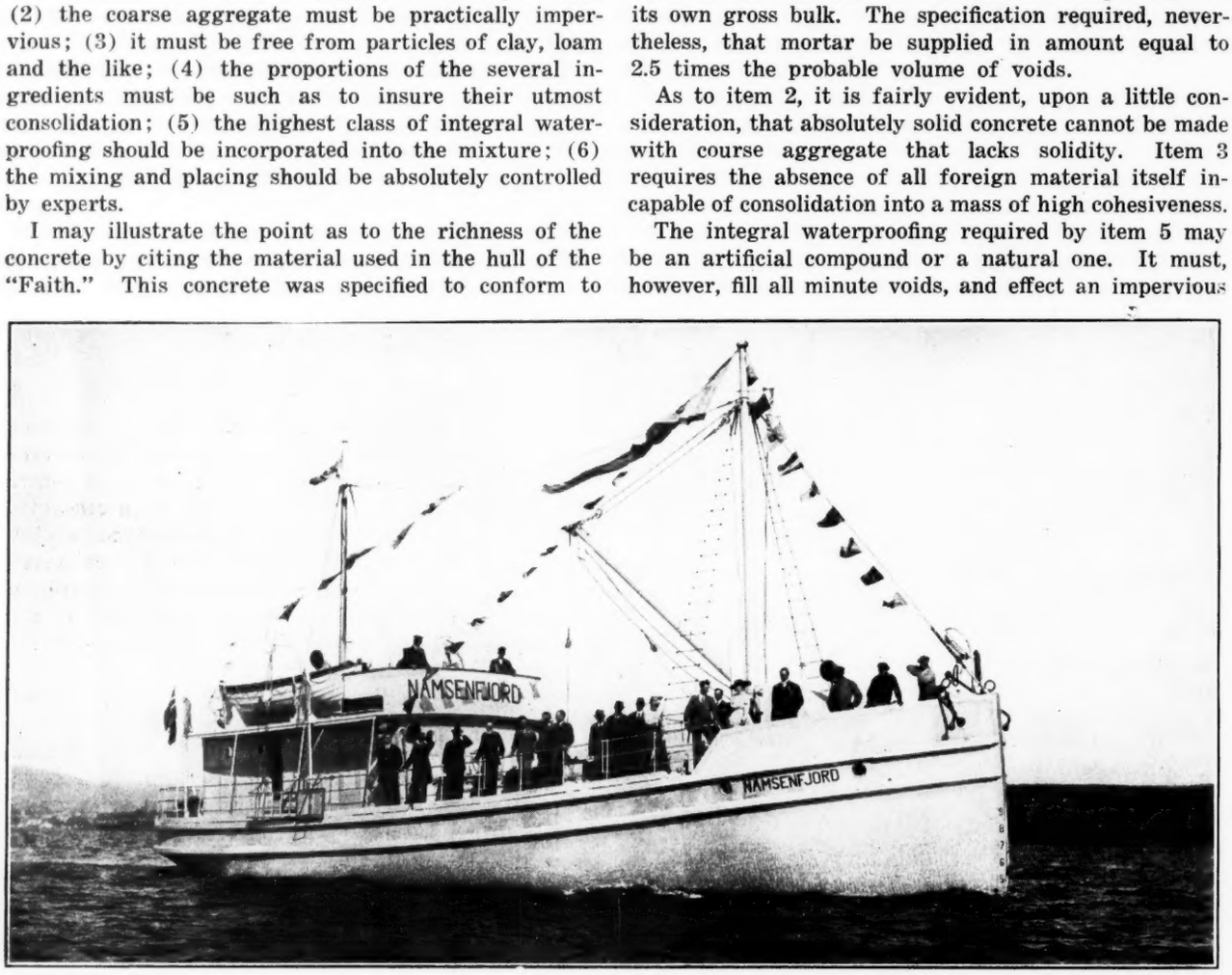


FIG. 4. MOTOR-DRIVEN REINFORCED CONCRETE LIGHTER

Item 6 has its place, not merely to round out the list, but because of its vital relation to success. All the requisite materials may be employed and yet success be perfected, because of some deviation from the best technique.

Let us now leave imperviousness and consider the question of shocks. Some may be apprehensive as to what will take place when, for example, a reinforced-concrete vessel bumps into or rams a pier. If the pier is not a good one, we may expect it to be damaged. At the worst, the injury to the vessel will probably be rather sharply localized. Naturally, there is but little information available from actual experience with concrete vessels. There is, however, a pretty good equivalent in the shape of experience with other concrete structures that have been subjected to shocks.

Shocks are of two kinds: The cushioned impact of a heavy bulk; and the rapid, projectile-like blow of a swiftly moving object.

As to cushioned impacts, a good example may be found

in the regular practice of driving reinforced-concrete piles with a pile driver. Practically the only difference between driving reinforced-concrete piles and ordinary wooden ones is that with the former the blow may perhaps be cushioned more carefully by a more elaborate system of blocks between pile and ram. The driving of reinforced-concrete piles by means of a cushioned blow is no unusual thing. It is the regulation practice. Thousands and thousands of such piles have been driven in this way. This consideration, by itself, is fairly convincing.

That reinforced concrete readjusts itself when subjected to slow-acting stresses would seem to be indicated by the case of a British monolithic reinforced-concrete building, which was in 1909 erected on 20 piers in a location subject to subsidence. In the course of six years actual subsidence took place. An inspection was made, revealing that 12 out of the 20 piles had lost contact and that there were only eight actually supporting the building.

This means that an extraordinary readjustment of stresses had taken place. Nevertheless, the investigation of the whole structure "failed to reveal any trace of weakness or strain," although the investigators paid "special attention to main beams, secondary beams and ceilings."

Another instance may be cited. A reinforced-concrete boat 64 ft. long between perpendiculars and having a weight of 58 tons was, when the deck was 50 days old and the sides 30, put under the stress of being supported at the two ends and of having the unsupported intermediate section 40 ft. in length weighted with 16 tons of evenly distributed load. The maximum shear was estimated at 26½ tons at the inner edges of the supports and the maximum bending moment at the center of the span at 419 foot-tons. A deflection of $\frac{1}{16}$ in. was observed. "There were no signs of surface cracking, flows or weakness of any kind."

A slow-acting blow was, in another instance, delivered to a reinforced-concrete pier by a vessel (of other material) rated at 8000 tons. Some damage was done, but it was confined to a few piles and some 20 sq.ft. of the decking of the pier. So much for the effects of slowly acting and cushioned blows.

The sudden blow is not an experience unknown to reinforced-concrete construction. A big explosion occurred at a British port, resulting among other things in the hurling into the air of a large steel girder. This came down endwise upon a reinforced-concrete wharf. It pierced the decking, but the damage was all localized in a section about 1 x 2 ft. in area. It is said that the adjoining beams suffered no damage at all.

No claim is made for reinforced concrete that it will resist any and all quick blows. Steel does not do this—as witness the piercing of heavy armor plate by projectiles—neither does wood. A strong, swift blow, sufficiently concentrated, must necessarily perforate any material, but reinforced concrete in such a case behaves admirably and receives only localized damage.

Another case illustrating this is as follows: On the Western Front opposite the British lines stood at one time a concrete water tank on trestlework at an elevation of some 50 ft. The Germans in retreating from the position dynamited the trestle legs, thus bringing the tank to the ground, "but according to written statements the shells which had struck the tank merely made circular holes through the sides and bottom."

From the foregoing it would appear that we may expect good behavior from a concrete boat or ship in a great range of accidents which befall both fresh and salt water craft.

A still further objection appears to have been brought against concrete boats. It is claimed that they are heavier than steel craft of equal cargo capacity. The validity of this objection will be at once admitted—at least up to vessels of considerable size. But this excess weight is not a serious objection, and has certain compensations. Perhaps the excess is sufficient to keep concrete craft out of the class of swift passenger vessels. The reason that a concrete boat is heavier than a steel vessel of equal tonnage centers largely upon the fact that it requires a relatively thick-walled hull to take care of tensional stresses. The specific gravity of reinforced concrete is moderate, being not more than, say, 2.75; while steel is heavy, having a specific gravity of, say, 7.85. Steel is, in fact, bulk for bulk, nearly three times as heavy as reinforced concrete. Consequently, the few inches of thickness required in the

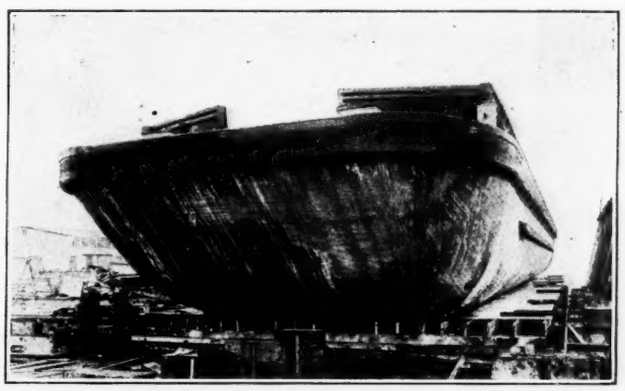


FIG. 5. A LARGE CONCRETE COAL BARGE

hull of a concrete boat do not mean such an extraordinary weight, after all.

There have been elaborate calculations showing the comparative weights of concrete and of steel vessels. These figures go up to the 6000-ton size, which is about the largest sized vessel designed for the coastwise coal-carrying business. First, we have the figures for unequipped vessels, then for vessels equipped. The latter are the more important figures, since the vessels must of course have their equipment on board. These data as given by T. J. Guerrite, are substantially as follows:

UNEQUIPPED VESSELS—EXCESS WEIGHTS OF CONCRETE CRAFT

	Deadweight Carrying Capacities in Tons			
	1000	2000	4000	6000
Excess percentages	39	25.8	16.5	11.8

EQUIPPED VESSELS—EXCESS WEIGHTS OF CONCRETE CRAFT

	Deadweight Carrying Capacities in Tons			
	1000	2000	4000	6000
Excess percentages	104	84	58	43

It is clear in both cases that while the relative excess is considerable for small vessels, this decreases rapidly as the size increases. The accompanying curves apply to decked cargo-carrying vessels in general and not to coal vessels primarily. They, however, give us the trend of the facts.

Fig. 7 exhibits the case, roughly, of concrete barges that are to be towed, while Fig. 6 shows the situation broadly governing self-propelled concrete barges.

While the former curve does not descend with the same rapidity as the latter, it is to be noted that it begins at a much lower point.

The standard size of coal boats towed from Pittsburgh to New Orleans is about 1000 tons. The curve (Fig. 7) shows that the concrete barge would be about 40 per cent. heavier than a corresponding steel barge. But, so far as I am aware, there are but few steel boats in this business, or none at all. At least the vast majority of the barges employed are of wood. This means that they are probably heavier than if they were of steel. In short, 40 per cent. is probably too large a figure for the excess weight of the reinforced-concrete towed barge over the wooden towed barge now in use.

This question of comparative weight is probably not particularly important in connection with the Ohio-Mississippi traffic, for the reason that the towboats

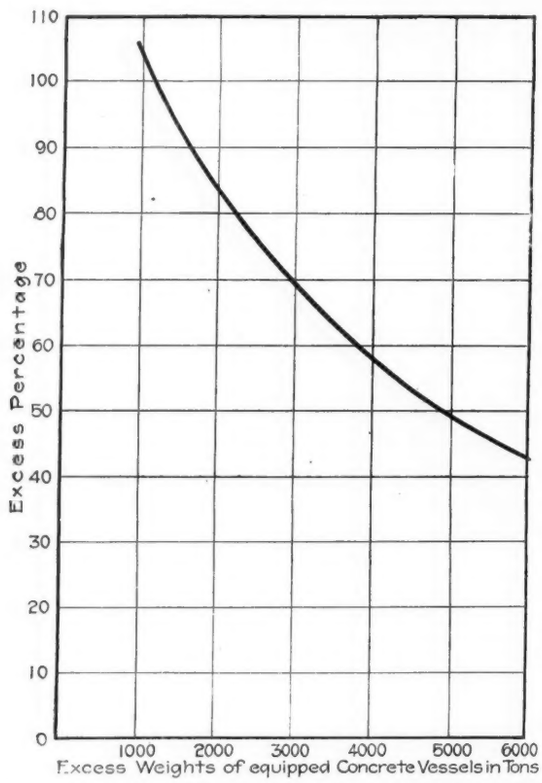


FIG. 6. COMPARATIVE WEIGHTS OF EQUIPPED VESSELS

consume relatively small amounts of fuel in their power plants as compared with the tonnage transported. Thus, the "Sprague" is one of the largest of the towboats running below Louisville (that is, from below the Falls of the Ohio), and yet its horsepower is rated at only 2175. The tonnage towed by this boat varies; but she has handled up to 56,000 tons loaded on 56 boats. The "Kaiserin Auguste Victoria" had, I understand, a cargo capacity of only about half this amount and yet her horsepower was 17,200.

Evidently, then, the handling of tonnage is an enormously different matter when done on inland rivers from what it is when done on the high seas. Thus even if reinforced-concrete towboats are 40 per cent. heavier than wooden ones, this difference will not play any big part in the operating costs.

As to coastwise coal traffic, we have both types of boats, the towed and the self-propelled, to consider. Offhand, one would say, after looking at the curve of Fig. 6, that it would seem that it would be mainly the bigger boats that would be profitable. Towed boats, it would appear, might well be larger than 1000 tons and thus secure the advantage of lesser weight.

As to the comparative costs of reinforced-concrete vessels and steel ones, it has been estimated abroad that on a pre-war basis the concrete hull would cost about 30 per cent. less than a steel hull of the same deadweight carrying capacity. The equipment for power-driven concrete vessels would be, however, about 5 per cent. greater.

One condition that we have now to reckon with is the possibility that it may soon become not merely difficult but impossible to secure steel plate for the purposes of barge construction. After the war, we may expect a continuing difficulty and also a stiff price because of the demand for steel that will be needed for reconstruction in Europe. Likewise, wood will probably continue expensive and more or less difficult to procure.

A further economic argument for concrete relates to the maintenance expense. This is an important point.

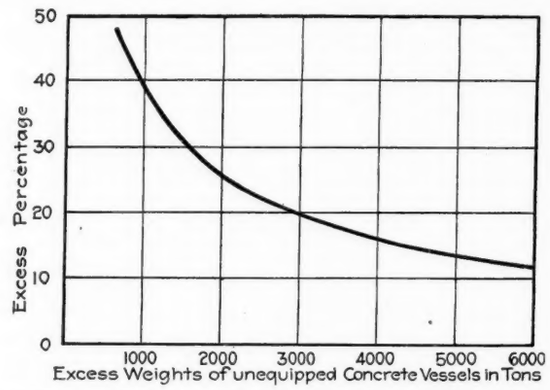


FIG. 7. COMPARATIVE WEIGHTS OF STEEL AND CONCRETE VESSELS

We have, perhaps, but little actual experience with concrete boats to fall back upon, although we have some, but we do have a big experience with other forms of reinforced-concrete construction. The 50-ft. barge previously mentioned is understood to have necessitated no expense whatever for its maintenance. We have knowledge of the ease, rapidity and inexpensiveness of ordinary concrete repairs, and would naturally expect the same to apply to boat repairs as well. Probably, nearly all repairs will be susceptible of execution as the boat floats in the water. This includes repairs to submerged portions of the hull.

For quick and efficient work after a mine disaster has occurred, a map of the mine is indispensable. Blueprint copies of the mine map should be furnished the captains of the rescue crews, the shift bosses and the official in charge of the recovery work. If a supply of maps is not available one map should be posted near the mine entrance for the convenience of all concerned. A line sketch of a map can be quickly made by an engineer and will be of much advantage to the rescue and recovery crews. Experience has proved that at least a dozen blueprints of the mine map should be kept at all times in close proximity to the mine.—*Rescue and Recovery Operations in Mines.*

Rocky Mountain Coal Men Meet

THE summer meeting of the Rocky Mountain Coal Mining Institute was a joint convention with the American Institute of Mining Engineers and was held in Colorado Springs, Colo., Sept. 3 to 6 inclusive. About sixty coal-mining men were there, while more than 300 metal miners were in attendance. A number of side trips were indulged in by those present. One day was spent at Pueblo, Colo., investigating the new byproduct plant of the Colorado Fuel and Iron Co. One of the most modern coke plants in America has been erected by the Colorado Fuel and Iron Co. A. C. Watts, chief engineer of the Utah Fuel Co., who has been serving as president of the Rocky Mountain Coal Mining Institute, was again tendered the office, but requested that the institute relieve him of the responsibilities. Thereupon John McNeil, one of the pioneer coal men of Colorado, was elected president. F. W. Whiteside was reëlected secretary-treasurer. All of the meetings conformed to the spirit of the times and bore a war flavor. The discussions as well as the papers that were read dealt primarily with safety and efficiency in mining. Practically all of the "regulars" were on hand, except a few of the familiar faces from Wyoming, and although Colorado is now in the "dry" column of states the crowd managed to shed its war worries and renew the ties of goodfellowship after a year of suspended activity due to the war. Following are some of the papers read.

Wartime Economies

By George B. Pryde
Cheyenne, Wyo.

IT WAS suggested to me when I was asked to write this paper that on account of the war activities affecting every phase of our industrial life the subject should be along war lines. I have therefore chosen war economies as a subject particularly applicable. There are many kinds of war economy that might be reviewed, but I shall consider only those things that apply to the mining of coal, as this more directly concerns us. At a time such as this, when priority orders are necessary to obtain supplies that are absolutely essential to the production of coal, it seems it is obligatory for us to practice the most rigid supervision in the handling of material of all kinds so that none may be wasted; indeed, this is a national necessity as well as a duty that devolves upon us.

Allow me to call attention to one phase of mining in which there is considerable waste; that of lubrication. This is a subject, I am afraid, that is often given but little attention. When we consider the large amount of machinery that is necessary to operate a modern coal mine, and that all the bearings must be properly lubricated to insure smooth working and normal life, as well as to prevent serious breakdowns, you will readily understand how necessary it is to provide for and insure proper lubrication.

Much good can be done in this direction by the large oil companies, who have trained men in the field and are always glad to be of assistance. The proper kind of lubricants for certain kinds of machinery should be given careful and serious consideration. It may not always be a question of providing the most expensive lubricant and relying upon this to be sufficient. Great care must be exercised in studying the conditions under which the machinery must operate, and then applying a suitable lubricant thereto.

The condition of mine machinery in regard to lubrication is so familiar that it would seem to be unnecessary for me to call attention to it. In fact, this might be classed as one of the subjects that become stale by repetition. Too often the person who is charged with the care and operation of machinery seems to think that the machinery itself will operate more smoothly if covered with oil and grease, forgetting that the proper and only places to lubricate are the bearings and rubbing surfaces. I believe I am safe in stating that if proper attention were given to this subject at least 15 per cent. of our bills for oil and oil products could be saved. At a time when these products are in strong demand for the prosecution of the war—for the ultimate triumph of humanity—it would seem to me that this is a subject that is of national importance and one that demands of us the most serious and earnest consideration looking toward eliminating waste and making for greater economy.

The subject of blasting and blasting material is one which also plays an important part in our mining operations. On account of the large amount of explosives that are being used today in the world war, and the increasing cost of our mine explosives and supplies, frequent inspection of the methods of storing, distributing and using should be made to prevent either waste in handling or the overcharging of holes. Many of our best blasters have gone into the service of the United States and into other occupations, and the new employees at these jobs are more or less unskilled. Thus the necessity for this inspection is immediately apparent.

The substitution of duplex iron wire for copper wire in blasting will be found to produce a considerable saving. The wire is used in connection with No. 6 dry cell batteries, and when electric cap lamps are used in the mines the lamp batteries are employed for blasting purposes. The foregoing may seem a small item, but when the high cost of copper is considered, the annual saving, especially in large operations, will be considerable.

In pillar work, where motors are used for haulage, it has been found a good system to use galvanized iron wire in the vicinity of the workings. In this kind of operation sudden caving frequently occurs burying and losing the trolley wire. Since galvanized iron is cheaper than the copper wire, the saving is evident.

For distances up to 2500 ft., on motor roads where 16-lb. rails are employed, it has been found economical to use old wire rope for a return. The rope used is generally from $\frac{3}{4}$ to $\frac{7}{8}$ in. in diameter, and is laid alongside of the rail together with a No. 6 bare copper wire. The rope and copper wire are tied together every

60 ft. and cross bonds to the rail are put in every 150 ft. This provides a good return, saves the labor of drilling and bonding the track, which is quite an item in these times of labor stringency, when it is necessary to conserve every man possible for the actual production of coal.

In erecting a high-tension power line recently, it was found that good results were obtained by putting the cross arms and insulators on the poles before raising them. To do the raising required considerably more men; but as unskilled laborers were more plentiful than skilled linemen, and time was an important consideration, the experiment was tried with good results. This may not be in accordance with common practice, but on account of the prevailing labor conditions the method worked out satisfactorily, and the line was completed in fairly good time; certainly in a much shorter time than if it had been found necessary to wait for a sufficient number of trained linemen to complete the work. While the figures are not yet available as to the cost, I am sure that it will compare favorably with erecting the poles and then putting on the cross arms and insulators, even though more unskilled laborers were required. In connection with the stubbing of pole lines, it has been found that the reinforcing with concrete at the bottom of the poles has worked out satisfactorily. This system is nothing new, as it has been followed for several years, but as between stubbing and concreting I consider the latter preferable as a war economy, because the work can be done with common labor, whereas the stubbing requires that more or less of the work be performed by skilled linemen. The concreting is much more durable and has the merit of saving skilled labor, and anything that does this may be classed as a war economy.

The use of steel ties has been experimented with to some extent for several years, and these experiments have reached the stage where the use of such ties is recommended, especially in low seams. They are particularly adapted for this kind of work, for they provide a good rigid track and give greater headroom than the ordinary wooden tie, thus cutting down the taking up of bottom to provide sufficient height for haulage purposes. They are easily and quickly laid, and while they will cost about twice as much as a wooden tie, their longer life and adaptability as a labor saver recommend their more general use in mining low seams.

The war has made a heavy demand upon our timber resources, not only in this country, but in all of the countries at war. In France many of the finest forests have been destroyed by fire and shell, and it will take years to replace that which has been destroyed and grow timber to take its place. On account of these conditions in Europe there will continue to be a heavy demand upon our timber resources for many years to come, both for use in our manufacturing industries and for shipment abroad. The conservation of mine timber is something that should demand our serious consideration. Timber is one of the most essential materials which we use in mining work, and before many years substitutes of steel and concrete or both will be required, and the cost of these will be much greater than that of timber. There are two ways by which timber can be conserved; namely, treating the timber that is to be used in permanent work, such as for timbering haulageways, main air courses and the ties for the main haulageways, and the recovery of timber in rooms and pillars. When it is considered that an 8-ft. prop at the working face costs about 50c., it will be understood that it does not require much effort for a man to recover enough timber to make his work attractive from an economical standpoint. The objection may be made that this is dangerous work, likely to increase the casualties; but with the different kinds of mechanical prop pullers on the market today this work can be made fairly safe; in fact, as safe as any other operation, if men of good sound judgment are used to do this work. In the mines of Europe for a great many years the subject of recovering mine timber has been given close attention, on account of the high cost of this material, and these conditions are rapidly approaching in this country. It is safe to assert, I am sure, that not more than 5 per cent. of the mine timber put into American mines is ever recovered; but more and more this question will demand our serious and careful consideration, from the standpoint of conservation and national economy.

Previous to the war, all mine supplies could be purchased at a very reasonable price; in fact a good deal of machinery was scrapped because it was nearly as cheap to buy new machinery or new parts as to repair the old. Now this condition is changed, and with the high prevailing prices of all machinery and supplies, and the slow delivery, I am sure it would be a good idea to give the scrap piles at the mines close

scrutiny. No doubt we shall find much material that can be used over again, thus saving new supplies. It may not be just what is wanted, but with minor changes it may be possible to substitute and adapt it to requirements. Care should be exercised in scrapping material these days, and old material should be used and worked over as much as possible because labor is a scarce commodity today, and anything that will save a man's labor and relieve him for some necessary work is worth our greatest efforts. We will be doing our bit toward winning the war, just as much in this way as in any other.

Of course, I do not wish to be misunderstood, or to be taken to mean that in advocating the use of scrap that new material should not be ordered, as a certain amount of new material is necessary; but I certainly would watch carefully indiscriminate scrapping.

On the other hand, material that has been definitely scrapped should be removed as rapidly as possible, not only from the standpoint of cleaning up the plant, but more particularly because the nation needs it in the prosecution of its war work. It can be rapidly converted into new material with a minimum of labor, and so we owe it to ourselves, as well as to the nation, to see that this material is used as a national asset.

Much guessing is being done today as to what will happen after the war. More particularly the probable effect of the after-war conditions on our labor supply is being closely studied and forecasts made. One guess is just as good as another these days, because events from a social and economic standpoint are changing so swiftly as to make our views and beliefs of yesterday past history tomorrow.

Some people tell us that on account of the heavy taxes that will be necessary for the restoration of the countries at war the laboring men of these countries will flock to the United States to escape taxation; others tell us that there will be so many opportunities for business of all kinds after the war that many of our foreign-born citizens will return to their own countries in preference to continuing their residence here. Regardless of these different views, I believe it is reasonable to suppose that on account of the rapid depletion of their man power by the ravages of war, stringent laws will be passed by the present belligerents against emigration; in fact, I believe that inducements will be made for those of other nationalities to settle in these countries.

On account of the vast work of restoring those nations which have been at war, much of the material for this work will have to be furnished by the United States. It looks, therefore, as if we will have a labor shortage for years to come, particularly in coal mining. Many of the mines of Great Britain have been shut down during the period of the great war, and it will take years to put them on a producing basis. Some of the most productive mines in France and Belgium are in the hands of the Germans, and when these are returned, they will be so badly wrecked that it will require years of patient effort to put them in operation again, while some it may not be wise to reopen at all.

All this would indicate that the United States must supply the coal deficit of these nations for years. This will mean that we will have to improve our methods of production, and the only way to do this is by a greater use of machinery in the mines—increasing the number of haulage motors, the cutting of a large percentage of coal with mining machines, the greater use of electric drills and loading the coal mechanically. Probably the item that appeals to us most is the last one mentioned, for while many loading machines have been tried out in the last few years, few have been successful. In the high coal beds, where the roof is good, the loading of coal by electrically operated shovels does not present many difficulties. What is wanted today is a loader that will operate successfully in beds from 6 to 12 ft. high.

I am in hopes that after the war, when so many men will return to civil life with good mechanical training, someone will work out a shovel with few moving parts—one that can be operated by one man. A shovel of this kind that could load 50 tons per day, and could be put on the market at a low cost, would be much better than one that could load 150 tons per day where the cost and maintenance are high and where several men are required to operate it. For coal under 6 ft., conveyors will come into more general use through a system of longwall or modified longwall operation.

Increased Production in Wartime

By R. M. Magraw
Hiawatha, Utah

In This paper I will not attempt to show the relationship of coal to war, but will endeavor to indicate, by a few suggestions, methods which appeal to me as being worthy of consideration. Some of these, if followed, might lead to increased production.

Everyone should be thoroughly familiar with the importance of coal in the present crisis. The daily papers, technical publications and other periodicals have from time to time contained articles dealing with some phase of the situation. And among other commodities which it has been stated would win the war, coal, I believe, occupies a commanding, if not an impregnable, position.

This has been called a "war of science," and certainly more than ever before have scientific appliances and methods been called upon as an aid to man power by all of the belligerents. Brute strength without scientific backing would be impotent. Had it not been for the perfection and precision of the French field pieces at the first battle of the Marne, we would probably now be fighting the Huns on our own territory.

The coal industry was formerly held in low esteem by the public. Persons employed in it were looked upon with commiseration and pity by the average citizen, whose knowledge of coal mining and its importance to the industrial life of the nation was slight. At the present time, however, it is doubtful if there is a man in the United States who questions the importance of the coal mines. There seems to be also a much greater respect shown for the industry, and for its employees. But, lest we merit a return of the public to the first mentioned attitude toward us, we should utilize every scientific method known, not only to increase the output of our mines but to so prepare our product that the greatest number of heat units can be transported and stored in the smallest possible space.

Proof has been adduced that the coal shortage was and is due more to lack of adequate transportation facilities than to inability on the part of the coal mines to rise to a situation, which is acknowledged to be serious in the extreme. Notwithstanding the patriotic efforts of a majority of the mine operators and their loyal employees, the situation grows more acute and we are falling behind the schedule set by the Fuel Administrator as being necessary to maintain if we are to avoid a serious shortage in the near future. Placing the blame on the transportation lines, however, does not absolve the coal mines from all responsibility, neither does it utterly condemn the railroads, as the fault is not entirely theirs. They have been hampered and heckled by Federal, state and local legislation, and so-called regulation for years. And while it is true that the "public-be-damned" policy, inaugurated by some of the earlier railroad magnates and followed by others at an even later date, was responsible for the spirit of antagonism and lack of sympathy to all transportation companies, shown by both press and public, it is also true that the attempted regulation was carried to an extreme, with the result that all incentive on the part of the railroads to expand and prepare for the future was removed. Furthermore, the herculean task suddenly imposed upon the transportation lines, as a direct result of the entrance of the United States into the war, was so far in excess of anything that could have been anticipated in peace times that some allowance should be made for their temporary inability to meet it. The blame, if any, seems to rest with the American people as a whole and not with any single industry or class of individuals.

Government ownership may solve transportation difficulties, but it will be found necessary, before the problem can be classed as one of those which we have met and answered, to furnish the railroads with a much greater supply of rolling stock and motive power than they have had at any time, past or present. Judging from orders placed for new equipment this year, however, the end is not yet in sight.

As stated above, it is conceded that the entire responsibility for the coal shortage does not rest with the railroads, although the tonnage lost today through lack of cars is just as impossible of recovery as that lost through mine disability or failure of men to report for work.

It has been proved conclusively that nothwithstanding the inroads of the draft, voluntary enlistments and loss of men to munition plants, ship yards and other establishments offering special inducements, the men remaining in the industry can, if certain factors entering into the equation be given proper consideration, produce all of the coal which seems necessary at this time. The problem before us is, however, to so coördinate the various factors that the result may be obtained before it is too late. Since at least one of these factors is an unknown quantity—namely, the personal equation—any preliminary figures are apt to be subject to correction. Petty strikes and malingering by individuals who either refuse to do an honest day's work when under ground or who persistently lay off one or more days per week, are responsible for the next greatest inroad on production after lack of transportation. The first mentioned cause is difficult to control, and unless the men can be made to see that the success of our armies abroad is more vital than some paltry victory of their own over an operator, who in all probability would have gladly mediated the affair with them in the first place and thus avoided a shutdown, it may grow to be a menace to our very existence. Laying off without a justifiable excuse is also difficult to handle, although it appears to me that a stiff fine, payable to the Red Cross or some other recognized association, would in a large measure curtail the evil.

The very human desire on the part of the miner to better his condition and to try the unknown is responsible for a continuous movement from camp to camp and from field to field, with a resultant loss of man power. This, while hard to calculate, must entail a great potential loss of tonnage to the industry as a whole.

With the company with which I am connected the labor turnover amounts to from 15 to 20 per cent. per month, and I feel safe in saying that these figures will hold good for the entire State of Utah. It thus readily can be seen that if only one or two days are lost by each

individual between the jobs the aggregate loss of tonnage is considerable, even in a small producing district, such as Utah.

A system of registration under the "work-or-fight" ruling, whereby the employee would be given a card each month upon which would appear a statement from his employer showing the number of shifts worked, actual efficiency of the individual and time lost without just cause, which card would have to be submitted to someone in authority and the miner assessed a penalty for failure to work, before another card could be issued, would in a large measure eliminate this source of loss.

Drunkenness, of course, contributes to a certain extent as a cause for loss of time. However, I do not believe that the coal miners, as a class, are any more prone to drunkenness than any other like number of men in other industries. The active solicitation of men by unscrupulous operators should be prohibited. This situation could be handled efficaciously by the Federal Administrator and another leak thus stopped.

Payment of so-called bonuses by operators, whose mines are either deficient through natural causes, by lack of knowledge on the part of officials, or insufficient capital wherewith to properly equip them, should be prohibited and these mines, except in rare cases where they constitute a sole source of supply, should be closed down and the men there employed transferred to other mines where greater efficiency could be secured. Undoubtedly there are mines working thin coal beds where the output per man per day may be high under the circumstances, but it is possible that by shutting down some of these operations and concentrating the men in mines where thicker seams prevail that a much higher tonnage per man per day could be secured.

The operation of so-called wagon mines, where shipment is made by rail, should also be discouraged, except in certain instances where it might be proved that the mine was efficiently operated and did not add to the scarcity of railroad equipment by tying up cars unnecessarily. The opening of new mines indiscriminately, especially by inexperienced people, should be prevented, except in cases deemed expedient after due examination and favorable report by competent investigators.

Several new mines have been opened in the State of Utah during recent months, but I do not believe that they will add one ton to the production of the state for the current year, as the entire tonnage could have been produced by the older and better equipped properties if they had had ample man power. In some instances I believe that the new mines will result in a decrease in possible production. I judge that like conditions exist in other sections. Many old mines could be shut down for the duration of the war, and, if their employees were concentrated at more efficient properties, an increase in output would result.

The foregoing are only a few of the ways in which efficiency can be raised. However, lacking authority to put any of the suggestions into effect, it seems that we must go deeper into the subject and endeavor to find some means by which we can meet the present urgent demands. But before accepting any panacea as being the one most suited to our ills, we should be doubly sure that we are prepared to assimilate it.

We may, by friendly coöperation and admonition, so imbue our men with a spirit of patriotism that they will voluntarily enlist for the campaign, as it were, and thus furnish the additional coal necessary, so that intermittent railroad service can be obviated to a certain degree.

A plentiful supply of cars does not relieve the situation if the mine is unable to load them. Likewise plenty of men, all willing to do their bit, cannot produce any more coal than the company is prepared to take away from the face. The operator should therefore see that his house is in order before he places the blame elsewhere.

No excuse should be furnished the miner for failing to perform a maximum day's loading. The operator should see that all places are properly cut and shot in time to insure an ample supply of coal; that the tracks throughout the mine are in good shape so that the coal may be hauled with the least possible delay; that the ventilation of the mine is of the best so that the men can work without discomfort; that material usually furnished by the company, such as ties, rails, spikes, etc., are kept within easy reach of the working faces where they can be secured by the contract miners and others with a minimum of delay. The safety of the mine as a whole, as well as that of each individual, should be given constant attention, as even minor accidents tend to curtail production.

Breakdowns of machinery should be eliminated as far as possible. This can be done to a large extent by making frequent inspections and having repairs made as they become necessary. Duplicate repair parts for essential equipment should be carried in stock wherever possible, and all large mines or companies operating several mines should have facilities for making repairs on the job. These should cover everything but the largest and most complicated parts.

Mechanical devices used in connection with coal production should be of the latest and most efficient types. Inefficient equipment should be scrapped wherever pos-

Our Industrial Part

SOME observers think that the most characteristic thing about the American soldiers in France, something which astounds the enemy and excites the admiration of our allies, is the capacity of the American soldiers to do individual thinking and fighting. The German fights successfully only in mass formation, in organized bodies, while every American soldier has an initiative and independence of action which gives him remarkable efficiency in open fighting. They are not senseless cogs, but each is an individual working unit in a great fighting machine. Every American at home should feel an individual responsibility and do his or her individual part in winning the war. There is not an American citizen who can not help win the war. The Fourth Liberty Loan drive, which began on September 28, offers a great opportunity for concerted action and for individual action, and the loan will be a tremendous success if each American will do his or her individual part as each American soldier in France does his part. Our soldiers deserve such support from the people at home.

sible. Mine development should be kept in advance of reasonable production needs. Where possible, modern methods of working should be adopted. It is believed that, if all the mines in the country where such a method of operation is practicable, were worked on the retreating panel system, that the efficiency would be so increased that there would be no possibility of a shortage in production.

Almost every mine can, by the expenditure of a little money, increase the tonnage per man appreciably, and in many instances such increase could be made to run as high as 25 per cent. or greater. Such an increase in efficiency would not only go a long way toward solving the fuel problem, but would repay the operator many times over for the expenditure.

Employees and their families should be shown every consideration. Decent housing should be furnished and where possible the camps and surroundings beautified by lawns, trees and flowers. The employees should be encouraged to plant gardens and otherwise show an interest in their homes. This can only be satisfactorily accomplished by coöperation between employer and employee. Some little expense is connected with all sociological work, but the results are worth it.

A variety of colors should be used when painting dwellings, as the miner is entitled to as much individuality as any other small town dweller, and a camp painted all one color makes a poor showing as compared with one where taste has been exercised in selecting a diversified color scheme. As a small boy I often wondered why our Jersey bull had such an antipathy to red. In later life I decided that he must at one time have lived in a coal camp.

Amusement facilities should be supplied for both the miner and his family. This is a matter calling for a considerable outlay, but almost every company can well afford to expend a reasonable amount for the pleasures of their employees. This is particularly true in isolated camps. The education of the children should be well looked after and the school buildings should be equal to those maintained in similar centers of population in the surrounding district.

A place for religious services should be provided, and where a sufficient number of more than one denomination obtains, separate buildings should be maintained, if at all possible.

If it were feasible to adopt even a few of the above suggestions, we would be much closer to that Utopia for which even the coal miner is entitled to crave, and thus many of the problems which confront the industry would be automatically solved.

Mine Safety in Wartime

By D. Harrington
U. S. Bureau of Mines

THE feverish wartime demand for maximum output from the mines, coupled with the accompanying relaxed discipline arising largely from a shortage of labor, has in many portions of the country resulted in greatly decreased effectiveness of safety organizations and their work. This situation is not so readily apparent in regions which in the past have not had strongly organized safety work, but in those localities where a few years ago efficient safety inspections and regulations, were in effect and good records made the ill effect of present abnormal conditions is readily apparent. This is exactly as it should not be. Mine accidents not only result in suffering and expense to the victims and to the operating companies, but also the general public and the progress of the war are unfavorably affected by the loss of output not alone of those who are injured but also of other mine employees whose time and attention are occupied by the accident.

Definite statistics are not at hand as to the total amount of time lost in our mines due to accidents; however, we know that well over 2000 coal miners are killed annually in this country at this time, and a conservative estimate of the total amount of time lost due to accidents by our three-quarter of a million coal miners would aggregate at least three or four million shifts annually, with the resultant loss of at least 10 to 15 million tons of coal production.

Immense strides toward safer methods of mining have been made during the past ten years. This is well shown in the number of men killed in major coal-mine disasters, the reduction being both steady and rapid; in 1913, 464 men were killed in major disasters in the coal mines of the United States. This record was reduced to 316 in 1914, 262 in 1915 and 154 in 1916. While much progress has been made we still have with us many men of the old school of coal-mining, who insist that the safety movement is a "fad" and whose mines may in general be relied upon to be about as dangerous as they can be and yet "get by" when the state inspector comes round.

The employment in positions of authority or as safety inspectors of men whose sole qualification is many years of experience in mining, who frequently have little or no education and not much judgment, is one of the greatest obstacles to safe and efficient mining existing at the present time. Men of this type only too frequently think no mine should be considered gaseous unless it has had a major explosion, that dust cannot ignite or explode unless gas is present, that first aid is an "old woman's idea," that one air shaft is enough for any mine, that the "eating" of a certain amount of powder smoke will prolong the miner's life, that in fact conditions and methods of 20 or 30 years ago are applicable today. The time has arrived when men of this type should be used only in subordinate positions, leaving the decision of vital questions to the educated man with five to ten or more years of experience and with ability to observe and absorb present-day progressive methods.

Every mining company should have a well defined, active safety organization. Small companies cannot

He Has Given You Everything You Have

afford to have men employed exclusively for safety work, but they should have superintendent, foremen and bosses banded into a formal association with a definite head, with stated time to get together to discuss measures looking to safety (and possibly to efficiency). Some member should be designated to record data as to all accidents occurring, this data to be compiled from time to time and studied and analyzed with a view to determining causes of accident and best methods of preventing repetitions. Companies employing 1000 men or over will undoubtedly find that it will pay financially to have a man or men all of whose attention is paid to safety work, including inspections both on the surface and underground, following up accidents, keeping accident sketches, records, etc., compiling and analyzing such records, and possibly giving instruction in first-aid methods. It is recommended that the accident-record form of the United States Bureau of Mines be adopted with such modifications as may be deemed necessary, these forms being the result of many years' work and the experience of a number of authorities on mine-accident statistics.

That it pays in dollars and cents to have safety organizations can be seen by the number of mining companies that maintain such organization since the passage of workmen's compensation laws. One large mining company established a safety organization consisting of several men, and during the first year of its existence the number of fatal and serious accidents was reduced over 30 per cent. as compared with the previous year. During the next year the record was reduced by another 20 per cent. as against the first year of safety work. (In the foregoing a serious accident is considered as one incapacitating the victim for 14 days or over.) In another region a large company having a comprehensive safety and welfare organization had a record of producing nine times as many tons of coal per fatality as the average of nine other companies producing in the same field and under essentially similar natural conditions, the other companies in general making sport of the "fads and fancies" (as they styled them) of the company with the good fatality record.

While education of miners in safe and efficient methods of working is of immense ultimate value in reducing accidents, it appears that the results are slow and for immediate present-day effect the use of penalties and bonuses, together with educational work, give the best satisfaction measured in quick returns. It is found that many bosses give only indifferent coöperation in the enforcement of safety rules unless offered some incentive such as cash or some other prize for having a good accident record or for excelling the record of other bosses or departments; these prizes should be given to all bosses actively concerned in underground work, but coupled with the prize or bonus system there should be a penalty system assessing loss of money or time for non-compliance with safety regulations. The miners and other day or contract and underground employees can best be handled as to safety by penalizing them for the infraction of safety rules by a "lay off" or money fine on one hand (the money to go to some charitable purpose such as the Red Cross), and by giving prizes or bonus for keeping a place safe, for being at work a maximum number of days per month or for cutting or loading a maximum coal tonnage per month or per year.

Will You Lend It Back To Him?

It may be insisted that assessing penalties is out of the question with labor in its present state of independence. Yet if the penalty is assessed for the purpose of protecting the man from accident he cannot object seriously while the departure of an unsafe man is to be desired rather than deplored. A large portion of the present relaxation of discipline is due to over-anxiety of employers to retain labor and to draw it from neighboring enterprises. If employers would reassert themselves (as they should) in regaining control of the discipline which existed even a few years ago, it is probable that little real opposition would be encountered, if the effort was made in a tactful way. I have in mind several serious accidents in mines during the past year brought about by the victim's performance of acts which he would not have attempted two years ago because of knowledge of punishment certain to follow.

Lack of supervision is one of the most potent sources of accident and indeed of loss of life and of property in mines. The fireboss who is compelled to run through his "beat" in order to cover the territory assigned him is absolutely unable to perfom his inspection in an efficient manner. There should be sufficient firebosses to every mine to allow of the spending of at least a few minutes at every working face and to permit of walking between places. To do this the fireboss may be compelled to spend more hours underground than at present, and possibly there would be required an increased number of firebosses.

Shotfirers, too, should not be allowed to light fuses on the run, as is frequently done. In general the shotfirer should be compelled to inspect the hole and load and fire all charges. Where holes are loaded by miners the shotfirer should be required to remain underground a sufficient length of time to allow of firing all shots in a thoroughly safe manner.

Especially in the pulling of pillars should ample supervision be supplied, and a pillar boss of ability and force of character can in general more than save his salary in the recovery of props, rails, ties and coal as well as enforce safe and sane methods of work. In general, such a boss should not be required to have in charge more than 20 to 30 men, and these should be in a somewhat confined region. At this time, when extremely high rates allow miners to accumulate in a few hours what was formerly a day's wage, the miner is only too likely to seize on any convenient excuse to leave his work. Frequently, if a "straw" boss is at hand the deficiency complained of may be supplied quickly, the miner's pretext for leaving removed and the miner held

at his post. Where miners are under written agreement to remain at work a certain number of hours per day, the presence of a boss over a limited number of men will keep these men at their places whereas in mines having but one foreman and no other sub-bosses, the miners will probably leave work hours before the agreed time.

In one coal-mining locality where subscription quotas for Red Cross, Liberty Loans, Thrift Stamps, etc., were promptly and largely oversubscribed, and where miners or other camp employees even suspected of shirking in the slightest degree any of the ordinary war time responsibilities were summarily treated by the miners themselves, the amount of coal mined per man employed by the company fell from 5.03 tons per day in 1916 to 3.08 tons per man per day in 1917. This decrease in efficiency took place at a time when demand for coal was urgent and when labor was scarce, and the cause was wholly uninfluenced by any change of conditions except that the high wages of 1917 enabled the contract miners to work three to five hours per day and then have earned $7, $10 or $13, or even more, whereas in 1917 they would have remained a full shift to earn that amount. Had the company placed a sufficient number of sub-bosses in charge these men could have been compelled to adhere to their signed agreement to work eight hours per day. Moreover, this would have prevented the danger to life and limb caused by the traveling of haulageways by large numbers of contract men during working hours.

Buy a Bond—Loose the Eagle

The disinclination of miners and mine officials to change from old methods to newer and safer ones results in perpetuation of many dangerous and inefficient practices. Only too frequently is progress met with the statement "It can't be done," this statement often carrying the inference "It won't be done." In one large metal-mining district where lighting was by candle and numerous enormously expensive disastrous fires and accidents were traced directly to their use, a recommendation for substitution of carbide lamps was ridiculed by miners and mining officials alike; yet within a year candles were practically discarded and the lighting cost reduced at least 30 per cent.

In a coal mine shooting coal off the solid, using black powder, numerous explosions occurred until undercutting machines and permissible explosives were introduced; because the machines caused considerable trouble and expense for upkeep and because machine runners were hard to manage, the foreman and superintendent threw out the machine, though the total cost off coal had been reduced and the percentage of lump coal increased by use of machines. In less than a year after discarding machines and permissible explosives from this mine and returning to black powder and shooting off the solid, a disastrous explosion occurred in which two lives were lost and one-half of the mine wrecked so badly that it required several years and the expenditure of nearly 100,000 to reopen it.

This disinclination of mining men to change from obsolete practice to safe modern methods annually costs many lives and frequently results in loss of much property and of entire mines. Although almost any progressive mining man realizes the danger of ventilating even a non-gaseous mine (especially a large mine) with but one air split, yet one can find gaseous mines in many sections of the country with but one ventilating current sweeping the entire mine. Again, while it has been demonstrated repeatedly that by the use of panel mining, ventilation, fires and even explosions can be readily controlled, yet one finds entire coal fields worked on the same dangerous and extravagant system of 20 years ago, even though the natural conditions are admirably adapted to modern panel mining. It is unfortunate that even in some mines that are safe in many particulars occasional practices are allowed through carelessness or ignorance which nearly nullify the safe features.

Mines which undercut all coal by machines are found leaving the cuttings under the coal to such an extent that the shooting is essentially on the solid. In other cases the coal is undercut and permissible explosives used for the sake of safety, yet the holes are charged with seven to nine sticks (3½ to 4½ lb.), thus practically doubling the safety limit set for the amount of permissible explosive per charge. The same total amount of explosive could be employed in a perfectly safe and far more efficient manner by the drilling of a few extra holes.

Frequently operating companies allow efficient methods or practices to become dangerous and wasteful through lack of even occasional inspection or supervision, or through carelessness or even deliberate intent to discredit such methods or practices by under-officials or employees. An explosion was alleged to have been caused by shots in a coal mine supposed to be using permissible explosives exclusively. It was afterward discovered that a miner had inserted some 40 per cent. dynamite into the hole before the shotfirer came around to place the permissible explosive.

Although miners, by working three to five or six hours per day underground, are now earning wages which allow of ownership and operation by them of high-class automobiles, yet they are often disinclined

to do their work in a safe, efficient manner. A mine manager in a mine using permissible explosives complained bitterly of the increased percentage of slack coal and blamed the explosive. Upon investigation it was found that instead of the slack from undercutting by electrical chain machines, being removed, practically all such material was allowed to remain under the coal due to the laziness of the machine men. Hence this coal was shot essentially on the solid. Moreover, instead of using seven or eight holes, each charged with 1 to 1½ lb. of permissible explosive, to bring down a room face as had been the previous practice, four or possibly five holes were employed, each charged with 2 to 3½ lb. of explosive.

Furthermore, instead of firing the "buster" shots and loading out the loose coal before loading and firing the other holes, all the holes were loaded and tamped before any were fired; and when firing was started, it progressed to completion before any loading out of coal was attempted, even though frequently practically all the work of a loaded hole had been done by one already shot. When this situation was brought to the attention of the mine officials they said they had been too busy to look after such details.

One of the effects of the present prosperity of the miner, especially the coal miner, is a disinclination to take time for training in first-aid methods. Bureau of Mines representatives have much difficulty, especially in some parts of the coal-mining regions of the West, in obtaining men to whom to give training in first aid. In some places no active opposition is encountered, but comparatively few men appear for training; in other localities the instructors are told that the miners have been "first-aided to death."

Generally, first-aid training is given by Bureau of Mines instructors at night in order to avoid interfering with mine operations, and the miners are expected to take the training in first aid without being paid therefor. Nothwithstanding the heavy earnings of coal miners at this time, they seem to be disinclined to take training unless paid by the companies to do so, though in general the miner rather than the company is the beneficiary.

As an instance of the effectiveness of first-aid training for coal miners, the men of one coal mine were trained in first-aid methods and practically all injured men come out of the mine well bandaged. The men and management of an adjoining mine working the same coal bed and having practically identical working conditions gave no attention to first-aid practices, and little or no bandaging of injuries was attempted other than using old-fashioned methods. The doctor in the latter camp complained bitterly of infection of wounds, stating that hundreds of shifts of work were lost by men in his camp annually due to infection of trivial wounds, while at the camp using first aid freely there was practically a total absence of infection. War times are made an excuse for the existence of all kinds of unsafe and uneconomical practices. Notwithstanding the passage of an act to safeguard the sale, use and storage of explosives, unsafe practices and conditions both on the surface and underground are only too frequently found. Lack of men or of material or of money are alleged as a cause for non-compliance with regulations. Electric wiring is rapidly increasing underground, and many of the electrical installations are extremely dangerous. Among these might be mentioned fastening wires to posts by nails or wire or rope, setting motors on timbers that soon become oil-soaked and placing switches on posts or flimsy timber partitions. Lack of men or material is given as the reason for such admittedly dangerous conditions. Moreover, many mining companies claim that no improvements or changes should be made now, giving generally as a reason that all men should be kept on coal production. They forget that a fire or explosion caused by dangerous conditions or practices may cost many lives and result in loss of the entire mine.

On the other hand, some companies are taking advantage of high earnings to fortify their mines as to future safety. One large metal-mining company has recently embarked on a ventilation program which contemplates an expenditure of over $1,000,000. This firm has ordered surface fans with a total capacity of over 3,000,000 cu.ft. of air per minute, and in addition will have over 300 new small booster fans for underground service. This company wishes to improve the underground conditions while earnings are large and at the same time be prepared with the best possible working conditions to compete with its rivals when selling prices drop after the war.

It is quite noticeable that small mining companies in general give much less attention to safety than do the larger ones, and in general the accident record of the smaller companies is not so creditable as that of the large concerns. State mine inspectors are almost unanimous in the opinion that small mines and mining companies are much more reluctant to obey the state laws than are the larger concerns. This is somewhat unfortunate and makes the task of the inspector difficult, causing officials of the smaller concerns to charge favoritism on the part of the inspector, when as a matter of fact the real difficulty lies in the non-progressiveness of the smaller concerns themselves.

Safety men, including state mine inspectors, frequently find that their most difficult problem is to impress the advisability of safe practices upon the miners that they wish to protect. On the other hand, only too frequently mine officials are prone to carry out the letter and forget the spirit of safety practices. At time of explosion or other disaster resulting in loss of life, the local management is generally demoralized or disorganized and incapable of acting or thinking efficiently. Moreover, operating officials seldom have had experience at disasters.

The state inspector, on the other hand, has had (or at any rate should have had) experience at disasters, has a general knowledge of the mine and its personnel and is not likely to be personally affected by the death of people who are probably strangers to him. While the company officials should be on the ground to aid and assist in every possible manner, the direction of the rescue and recovery work should be absolutely in the hands of the state inspector, and state laws accordingly should be amended to give inspectors absolute authority at times of disaster. The foregoing comments are general and meant to be constructive in nature.

Minecdotes

Bow Dougherty's Ghost

Bow Dougherty was one of the most superstitious of men. The existence of ghosts and banshees was to him a grim reality; and judging from his numerous stories, he had had a world of experience with spirits of all kinds. He always admitted, however, that each new ghost scared him quite as badly as on the first occasion. Personally, the writer has never seen a ghost; on one occasion, however, I have seen Bow while suffering from the effects of a ghost scare. To me it was very amusing.

It was an idle day at the mine and several of us had been sent to do some trackwork. At noon the fireboss came along to see how the work was progressing, and as usual Bow was relating some ghost story. Dinny Curley, the fireboss, was a practical joker, and, while he was a good official, seldom missed an opportunity for fun. After we finished eating, he called me to one side and told me to wait 20 min. and send Bow to the face of the gangway for track spikes. In the meantime he went out of the gangway, climbed up an outside manway, thence to the airway and down an inside manway to the face of the gangway. After shedding all his clothing he hid his oil lamp and waited for his victim. When Bow was within a few hundred feet Dinny turned his back toward him, bent his body forward and waved the light slowly from side to side between his legs. One look was enough for Bow, and in less time almost than it takes to tell he was back with us. To say he was scared would be describing his condition mildly. We expressed doubts as to the veracity of his statements and insisted on accompanying him to investigate, but there was only one direction in which he would go willingly.

In the meantime the fireboss had retraced his steps and when he again joined the group Bow retold his story. The fireboss listened with considerable interest and then, thinking to set him right on the ghost question, told him it was he and not a ghost he had seen in the gangway. Before he could explain, however, Bow exclaimed: "Go wan, now, Dinny, you can't make me believe that." Then, holding his hands in front of him, and about two feet apart, he continued, "The ghost I saw in there had a face on him that wide."

Great Britain's Fuel Research

By Mark Meredith
Liverpool, England

It is in the highest degree satisfactory to know that the whole question of the proper use of Great Britain's fuel resources, and of the practical problems which must be solved if any large proportion of the raw coal which is at present burned in its natural state is to be replaced by the various forms of fuel obtainable from coal by carbonization and gasification processes, is to be made the subject of authoritative national investigation, and that a fuel research station on an adequate scale is to be established for the purpose. All the arguments are in favor of the pre-carbonization of coal. It would centralize power generation, free our towns of smoke and dirt, yield valuable byproducts now burned to waste, provide large quantities of liquid fuel, and conserve the national fuel resources.

The practical difficulties are enormous, many private syndicates have found to their cost, and no really comprehensive scheme can be formulated, much less carried out, until certain definite problems in coal, power and byproduct distribution have been solved. A great amount of experience and trustworthy data are available in regard to the high-temperature carbonization as practised in connection with the manufacture of gas and metallurgical coke, but as regards the carbonization of coal at low temperatures there is no corresponding body of experience in existence, and few properly accredited data are available.

The British fuel research committee accordingly sees a way clearly open for a serious attempt to determine whether an economical and efficient apparatus can be devised for the carbonization of coal at low temperatures, and whether, by the use of such an apparatus, for the carbonization of properly selected coals, products will be obtained of a collective value greater than that of the original coal plus the cost of carbonization and handling. Nor is it merely a question of process and products; but there has also to be considered whether profitable outlets for the products can be found. It is for the purpose of making a full experimental investigation into the whole question that the fuel-research station at East Greenwich is to be built, and it will be designed and equipped in such a manner that operations on an industrial scale can be conducted under working conditions.

German Pre-War and Present Coal Prices

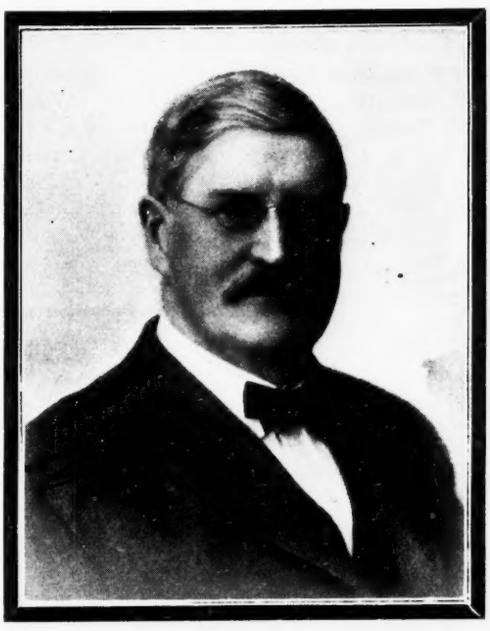
A remarkable advance in the prices of coal has taken place in Rhenish-Westphalia since the outbreak of the war. For the first time since the beginning of hostilities, according to the *Iron and Coal Trades Review* (England), the German newspapers have published a comparison of the prices charged by the Westphalian Coal Syndicate in the autumn of 1914 and those which came into operation on Sept. 1 last. These quotations are the so-called "guiding prices" which are charged to the merchants, who base thereon the sale prices which consumers have to pay and which are consequently substantially higher than the former, as they include merchants' and dealers' profits, the cost of transport, etc. As given by the German newspapers the comparison of the guiding prices is as follows, the quotations being for coal at the mines:

	Guiding Prices at the Mines on	
Bituminous:	Aug. 1, 1914	Sept. 1, 1918
No. 1 lump	$3.33	$7.17
Washed No. 1 nut	3.39	7.41
Washed slack	2.29	5.93
Coking coal	2.97	6.79
Gas coals:		
No. 1 lump	3.33	7.17
Washed No. 1 nut	3.39	7.41
Small, over 30 m.	2.24	5.94
Small unwashed	1.73	5.19
Semi-bituminous:		
Lump	3.46	7.17
Washed No. 1 nut	3.96	7.91
Small unwashed	1.73	5.19
Coke:		
No. 1 blast furnace	4.20	9.14
Foundry	4.21	9.15
Coke breeze	2.65	3.97
Briquets:		
No. 1	3.39	7.66

W. J. MURRAY

By Floyd W. Parsons

IN the death of W. J. Murray, vice president and general manager of the Victor-American Fuel Co., the State of Colorado loses the dean of its coal-mining industry. Not many men at the finish of their life's work will leave a greater host of friends, a cleaner record of deeds performed, or a better example of strong manhood than did Mr. Murray. His life is an inspiration to all of those ambitious souls of foreign birth who have left the land of their nativity to make a place and a name for themselves in this free country of unlimited opportunity.



Few men were possessed of greater courage than was he, but his boldness had eyes as well as arms. Not many individuals were more blunt in speech, but his very directness in getting straight to the heart of a matter was one of his principal virtues, for those who dealt with him soon learned that they would not have to waste time in getting his opinion in any matter. Underneath his rather stern exterior was a heart tender in its affections and a degree of loyalty that one could seldom meet. His friends were not picked at random, nor were they selected in a moment. It required time to win a place on his list of intimate acquaintances.

Born in 1852, in the County Durham, near Newcastle-on-Tyne, W. J. Murray entered his first employment early in life in the coal mines of England, where he worked until he left the British Isles at the age of 21 to come to America. The mines were a very real memory in his life, for both his father and brother were killed in a mine accident prior to his coming here. This early disaster, however, did not discourage his ambitions in the line of mining, and only made him the more determined to conquer the physical dangers and the hidden forces that surrounded his chosen vocation.

On arriving in the United States, he spent a short time in Pennsylvania, and then headed for Leadville, Colo., where he worked in the silver mines several years. Leaving the metal mines, he again took up coal mining, locating at Crested Buttes, Colo., and the rest of his life was devoted to this business, which he first chose when a lad in England.

In 1882, Mr. Murray married Martha E. Young, who, with five of his children, survive him. W. F. Murray, his eldest son, is now engaged in coal mining in Colorado, while his other boy is at Camp Hancock in his country's service.

In 1887, "W. J.," as he was familiarly called, entered the service of the Colorado Fuel and Iron Co., as superintendent of that corporation's mine at Sopris, Colo. Twelve years later he was appointed division superintendent for the same concern, remaining in this latter position until 1903, when he went over into New Mexico to accept a place as general superintendent of what is now the St. Louis, Rocky Mountain & Pacific Coal Company, at Raton. Two years later he entered the service of the Victor-American Fuel Co., being employed first as general superintendent, then general manager and finally chairman of the executive committee, which latter position he held at the time of his death at La Jolla, Cal., Sept. 11, 1918.

He was associated with J. C. Osgood, founder of the Colorado Fuel and Iron Co., for more than 30 years, and no man in the Rocky Mountain country has done more than has he to advance the science of mining in our western fields. Mr. Murray was a member of the North of England Institute of Mining Engineers, a former vice president of the Rocky Mountain Coal Mining Institute, a Shriner, Knight Templar and a Thirty-second Degree Mason.

I worked for and with him more than a dozen years ago, and as time passed my respect for the man steadily grew, until in his death I feel that the coal fraternity to which we all belong has suffered a loss that cannot be replaced. He was one who never fed arrogance or conceit with supple knees, nor was he deceived by the surface veneer of an empty pretender. His entire energy was devoted to vigorous execution, and he wasted no time in evasion and postponement.

Fortune's chariot did not roll easily for him in the early years of his career, but just as every light has its shadow and every hill its valley, so has every life its reward for honest perseverance, and his efforts were eventually crowned with no mean degree of material success. But far above property, which at the best is only temporal gain, is the force of a good example which lives on in the characters and conduct of those that follow. W. J. Murray's life, above all else, taught the virtue of simplicity and modesty. There was no room in his mind for the pettiness of personal vanity. He had reduced life to its minimum of essential needs and thereby had raised it to its maximum real power.

May we all leave such a splendid autograph on the hearts and characters of our associates as did he. May we surround ourselves with such influences that will hold us up as straight and strong in the days of trial. Then will we end our work and attain the only worth-while reward which comes in the self-consciousness of duty performed.

Anthracite Coal Stripping*—V

By THOMAS F. KENNEDY
Scranton, Penn.†

SYNOPSIS—*The best method of removing overburden from coal depends upon many circumstances but should be decided before the contract is drawn or operation is commenced. The space available for dumping may be (and frequently is) an important factor. The contract for stripping should be carefully drawn and contain as few ambiguities as possible.*

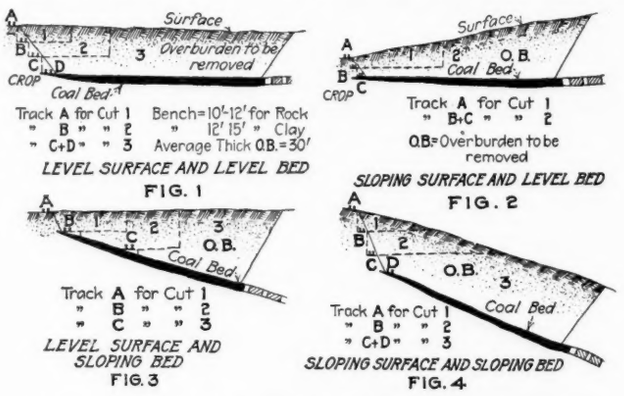
ONE of the most perplexing questions facing the engineer and the contractor in an anthracite coal-stripping problem is the method of removing the overburden. This paper will be limited to a brief but general discussion of the principles involved in the solution of this broad question. In general, anthracite coal strippings may be classified under three divisions—namely, crop, anticlinal and synclinal, the latter two being often termed hogback and basin respectively. These three divisions are subdivided according to the pitch of both bed and surface as follows: Crop—Level surface and level bed (see Fig. 1); sloping surface and level bed (see Fig. 2); level surface and sloping bed (see Fig. 3); sloping surface and sloping bed (see Fig. 4). Anticlinal—Level or sloping surface and anticlinal bed (see Fig. 5). Synclinal—Level or sloping surface and synclinal bed (see Fig. 6). With few exceptions, most of the strippings will fall under one or another of the foregoing types.

Before the method of removal of overburden can be decided upon the contractor, in coöperation with the engineer, should make a thorough study of the most important details of the problem such as the plans and specifications, amount and nature of excavation, strike and pitch of bed, surface topography, available dumping ground, drainage, water and fuel supplies, labor, and access for steam shovel and other equipment to the stripping area.

After an exhaustive study has been made, the problem resolves itself into the following: The removal of the necessary amount of material to expose the largest quantity of coal in the least time at the least expense. No set or fixed rule can be used in arriving at such a result, as each stripping problem has its own peculiar characteristics. In a fair-sized stripping proposition the contractor, if inexperienced, should employ the services of a competent stripping engineer.

In the removal of overburden several means of excavation have been used with good results, but the most economical and practicable, and the one recommended ordinarily, is the steam shovel, which has precedence over other types of excavating machinery. Electric shovels, however, have been used with good results. A few suggestions as to probable methods of removing overburden are shown in the accompanying cross-sections of typical strippings now under operation in the upper anthracite coal region. In many instances surface features will control the method of procedure in starting the cuts. Strippings in the upper anthracite region have an average overburden thickness of 30 ft. with few exceptions.

Fig. 1 shows a series of cuts whose total sum of vertical heights amounts to approximately 30 ft., which is considered the maximum height of clay cut. In solid rock, cuts 10 to 12 ft. deep seem to be the most economical. In such instances the small steam tripod drill can be used effectively in breaking up the rock into sizes that can be handled easily by the steam shovel. Jackhamers are sometimes used for reducing the larger masses of rock. In clay and soft shale, cuts up to 30 ft. can be handled economically. In soft shale rock the churn drill can be used advantageously. Holes 30 ft. deep can be drilled cheaply, and when properly charged and fired these do effective work in breaking down the shale into sizes small enough for the shovel to handle.



FIGS. 1 TO 4. RELATION OF COAL BED TO SURFACE

In Fig. 1, cut No. 1, or the first cut made, is known as the thorough cut, which often involves a question of drainage. The type of steam shovel used determines the depth and width of a cut. A 10-ton Bucyrus with a 2½-cu.yd. dipper is capable of making a cut 10 ft. deep and 40 ft. wide. Special shovels may be made for special work. The path of the shovel in most cases follows the strike of the underlying bed. The overburden should be so excavated as to reduce the number of moves of the steam shovel to a minimum. This detail is important since moving a shovel is a waste of time and money.

After cut No. 1 has been completed, stripping limit to stripping limit cut No. 2 is made, leaving a bench for a track as shown. In rock work benches are 10 to 12 ft. wide, while in clay their widths are 12 to 15 ft. Cut No. 3 is made over the whole stripping. If the thickness of the overburden exceeds 30 ft., the 30-ft. cut is made over the entire stripping and the same operation is followed out as in the beginning. Fig. 8 shows the method of making the cuts here described.

*The fourth article of this series appeared in the March 2, 1918, issue of "Coal Age."

†Now First Sergeant, Sanitary Corps, United States Army Water Purification Detachment, 301st Water Tank Train, Camp Holabird, Maryland.

The shovel has completed cuts No. 1 and No. 2 and is working in No. 3 cut. Benches for the tracks can be plainly seen on the left of the shovel.

The main object of making the preliminary cuts is to arrive at such a depth that the shovel can work most efficiently. Since the steam shovel cannot remove

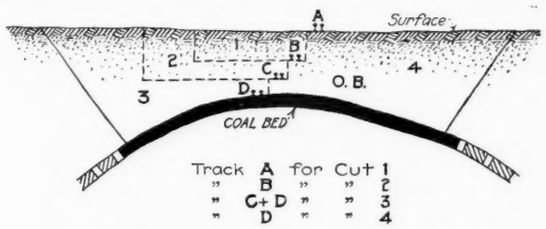


FIG. 5. LEVEL SURFACE AND ANTICLINAL BED

all clay, etc., from the top of the coal bed, hand cleaning with pick and shovel is used.

In Figs. 2, 3, 4, 5 and 6 it will be noticed that the principle involved in the method of excavation is the removal of overburden, so as to expose the coal as soon as possible for mining. The question of removing all of the overburden before coal mining is begun is often considered, but coal in the ground is money tied up, so immediate mining in most cases is resorted to. Fig. 9 shows a 70-ton Bucyrus 2½-cu.yd. shovel removing overburden 18 ft. in thickness in which a thorough cut and a finishing cut were made. The top of the coal bed can be seen in the foreground. The working direction of the shovel is parallel to the strike of the bed.

Cross-section and plan, Fig. 7, shows a side hill stripping where the overburden is transported by means of a plane to a restricted dumping ground located above the strip pit. This type of problem involves the consideration of starting to dump at the proper elevation and also of sufficient area for dumping purposes. Knowing the approximate amount of overburden in the solid and the swelling and shrinkage of the same, the total volume of excavated material can be calculated, so that the dimensions, height, top and bottom bases of the dump may be determined and the proper elevation and the

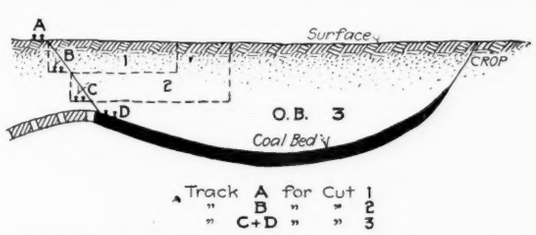


FIG. 6. LEVEL SURFACE AND SYNCLINAL BED

point of dump commencement are then fixed upon the dumping area.

Since the adjoining properties and underlying coal beds may be affected by dumped material such as the rolling of large boulders upon the properties and increase of pressure upon the surface beds under the dump, this phase of the problem should be studied thoroughly. The dumping ground question is highly important, and the dump should be so located and be of such size that the total material removed can be handled economically.

The drainage question should be investigated before actual excavation begins. There are three practical methods of drainage connected with a stripping problem—namely, natural, pumping and subterranean or mine drainge by means of a borehole or some other opening leading to the workings of the bed which is being stripped or to those of an underlying bed. Many of the strippings in the anthracite coal region solve the drainage problem by the last method. It might be stated that when the last method is used the amount of drainage should be calculated so that the mine pumps handling it together with the other mine water should not be overtaxed and so cause damage by flooding either live or abandoned workings.

In the anthracite coal region there are two general practical methods of removing coal—namely, by hand and with machinery or steam shovel. The selection of

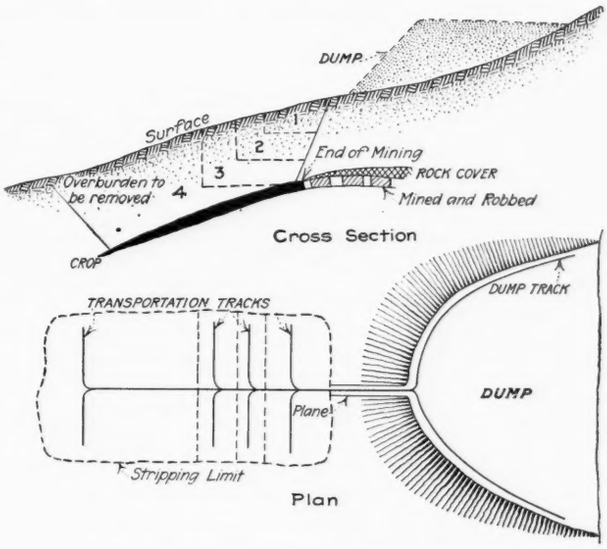


FIG. 7. CROSS-SECTION AND PLAN OF A SIDEHILL STRIPPING

either depends upon the relative or comparative economical advantages of each. For example, the steam shovel may be used in removing a bed 9 ft. thick more cheaply than ordinary hand mining, while in a bed 4 ft. in thickness the hand method would be preferable. Fig. 10 shows a basin stripping, where a 20-ft. coal bed is loosened by shooting. With the aid of a ¾-cu.yd. Marion steam shovel and small plane the coal is transported to the breaker. Fig. 11 shows a coal bed 4 ft. in thickness which, having been stripped, is being mined by hand methods of drilling, shooting and loading into the cars for transportation.

In connection with the mining of a coal bed 10 ft. in thickness or over, a churn drill may be used in drilling holes for shooting purposes. In a stripping proposition on a coal bed that has undergone its first mining the steam shovel is often used to advantage, because under such conditions there is mixed with the pillars an additional large amount of dirt which must be handled. In such a case the contractor and engineer should make comparative estimates of costs of both the hand and steam-shovel methods.

In connection with the removal of overburden and coal the important question of the contract arises. The

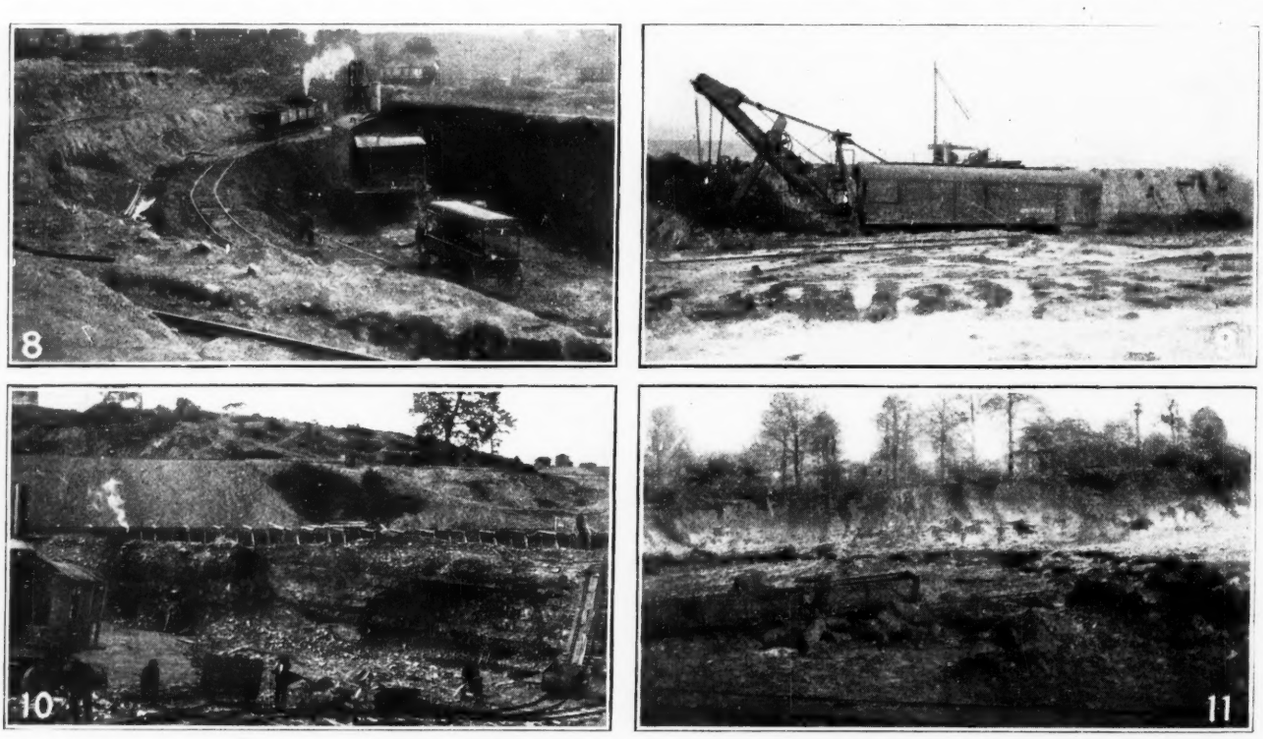
universal practice of the operators in the anthracite coal region is to let the work of removing the overburden on a contract basis to an outside contractor, while the coal is usually removed either by a steam shovel run under the direction and charge of a company foreman with the necessary laborers or to a contract miner who usually uses the hand method of mining. There are several reasons why foreign interests such as the contractors are involved in stripping. The company as a rule has no such well built-up organization as that of the contractor whose years of experience ultimately produce the more economical results for the company.

The usual form of a stripping contract is an agreement between the competent parties, the company or individual operator and the contractor, whereby a certain number of cubic yards of overburden or tons of coal are to be removed within a certain time at a certain price per cubic yard. Care should be taken in writing up a contract that only essential terms, conditions, etc., are mentioned. Ambiguity should be avoided; statements should be clear and forcible. Each article of the agreement should be specific, definite, concise and not a conglomeration of sentences having no direct connection with the article itself.

Although each stripping contract has certain terms, conditions, etc., peculiar to itself, the following essential points should be considered and are generally present in every ordinary stripping contract. In drawing up the contract the salient feature is the introductory agreement between the company or individual operator (the party of the first part) and the contractor (the party of the second part), to strip the overburden overlying a certain coal bed in a certain locality within definite time limits in accordance with definite plans, specifications, terms, conditions, etc. Maps and cross-sections showing the location of the stripping limits, approximate number of cubic yards of overburden to be removed and other vital features bearing upon the problem should be attached to the contract proper. The compilation of the contract then develops under two general heads—namely, those articles that have a direct bearing upon the actual removal of the overburden, while the second division covers conditions and terms in general.

Under the first division the following points are highly important: (1) A general description of stripping; (2) the number of cubic yards of overburden to be removed; (3) the stripping limits of area; (4) the average thickness of overburden; (5) the approximate percentages of rock and earth; (6) kind and number of excavating machines; (7) definite number of cubic yards to be removed monthly; (8) price of excavation; (9) classified and unclassified material defined; (10) payment per cubic yard in place; (11) nonpayment for excavation other than that specified; (12) cleaning top of coal bed; (13) extras and method of payment; (14) final estimate.

The second division covers the following points: (1) Provision of the equipment and the necessary diligence by the contractor; (2) water and fuel questions; (3) erection of necessary buildings and sanitation; (4) owner's right to mine coal at any time; (5) subletting of contract; (6) experienced foremen required; (7) payment of rates to employees; (8) insurance and workmen's compensation; (9) damages in case of hindrance to work; (10) suspension, failure to prosecute work; (11) disputes; (12) mechanic's lien; (13) general specifications, relating to definitions of engineer, coal company, contract misunderstandings, certi-



FIGS. 8 TO 11. ILLUSTRATING SEVERAL METHODS OF REMOVING OVERBURDEN AND COAL

Fig. 8—Method of making cuts for removal of overburden; benches on left for track; shovel working in third cut. Fig. 9—Bucyrus shovel (70-ton) removing all overburden, 18 ft. thick, after making the preliminary cuts; top of coal bed in foreground. Fig. 10—Showing removal of coal in bed, 20 ft. thick, by a Marion ¾-yd. shovel and plane, for transportation from basin stripping. Fig. 11—A bed of coal 4 ft. thick being mined by hand method

fied check and bonds, award of contract, unit prices used, quantities paid and the necessary signatures and legal questions involved.

One highly important article of the contract is the definition of classified and unclassified excavation. Classified material is generally divided into two divisions—namely, earth and rock. Sometimes it includes culm and loose rock, which often composes some of the overburden in a stripping proposition.

A certain contract disposes of these questions as follows: "Earth shall include clay, sand, gravel, loam, slate and decomposed disintegrated coal, stone and boulders, containing less than 1 cu.yd.; also stratified solid sandstone in layers of 8 in. or less in thickness when separated by earth as defined above and all other material not classified under rock. Rock shall include all solid slate and sandstone in place in layers greater than 8 in. in thickness, whether or not it is separated by layers of earth as defined above and all boulders containing more than 1 cubic yard."

Loose rock and culm are sometimes defined where local conditions are such that the earth and rock are so classified as not to include these materials.

Stripping operations are often handled inefficiently and with disastrous results due to many causes, of which underestimating is the chief. Underestimating arises chiefly from lack of training and experience, lack of test-pits and borings and cost data, probable future changes, fluctuation in wages and prices of materials, incompetent foremen, plant removal and depreciation, accidents and too small a margin of profit, both on material and labor, also possible legal expenses.

In conclusion, the contractor must have not only the hearty coöperation of the company and its representatives, but also the untiring interest of his organization before the best results can be produced.

Hinckston Run Mine of Cambria Steel Co.

By William E. Winn
Pittsburgh, Penn.

The Cambria Steel Co. has commenced the groundwork for a tipple, coal-conveying system and coal washery at its Hinckston Run mine, adjacent to Johnstown, Penn. This plant will furnish the main supply of prepared coal for the adjoining byproduct coke ovens, now under construction and known as the Rosedale Coke Works. The final plant will take care of a mine output of 6000 gross tons per day, or 36,000 tons per week. Of this amount 21,000 gross tons per week will be washed for coking use, while 15,000 tons will be crushed and then partly cleaned by a Bradford coal breaker for boiler, coking and producer use. The present installation will be one-half of the ultimate plant.

The coal-screening, crushing and washing machinery will operate six days per week, ten hours per day, and the traveling coal-handling bridge, which reclaims coal from the drainage pits and deposits it in the lorry bins, will operate seven days per week, ten hours per day. A belt conveying system will be designed to handle the final capacity.

The run-of-mine coal will be delivered by skips to a 1000-ton capacity bin with two steel hoppers equipped with mechanical feeders delivering a maximum capacity of 340 net tons per hour to the Bradford coal breakers. The breakers will be 12 ft. in diameter and 17 ft. long, with screens having 1-in. and 1¼-in. mesh. The coal dropping through the 1-in. mesh is used for coking after it is washed, and the coal dropping through the 1¼ in. for boiler and producer use. The breaker refuse (rock, slate and sulphur balls) will go to a 110-ton capacity bin for loading into railroad cars.

The coal-washing machines will consist of 36 Campbell bumping tables, 12 ft. long and having a capacity of 2100 tons per day. All exposed gear and chain transmissions will be equipped with substantial guards, to comply with all requirements of the Pennsylvania Department of Labor and Industry. Each washed-coal concrete drainage and storage pit will have a capacity permitting a day's operation of the coal-washing machines; each pit after filling with washed coal will be allowed to drain 36 hours before reclaiming the coal for coking; this system of draining off the water from the washed coal will provide a product for charging ovens, averaging 7 per cent. moisture. The containing structure is of steel framing with concrete panels; it will be completed early next year.

The washery will be practically a duplicate as to design and will handle the same grade of coal as the Cambria Steel Co.'s washery and coke oven plant at the Franklin Steel Works. This plant near Johnstown, Penn., has been in successful operation since 1904, operating on the Miller "B" coal seam; for the year 1917 the following average results were secured.

	Ash, Per Cent.	Sulphur, Per Cent.
Raw crushed coal—unwashed	11.5	2.4
Washed coal—see note	7.3	1.3
Coke from washed coal	9.4	0.9

NOTE—Eight per cent. of refuse was washed from the raw crushed coal.

The coal used in the ovens at the Franklin plant consists of 70 per cent. washed low-volatile coal and 30 per cent. of finely crushed high volatile coal thoroughly mixed before charging.

For the year 1917 it cost (per ton of coking coal charged) 11.83c. for handling and washing the low volatile coal and 5.07c. for handling and crushing the high volatile coal. This cost per ton took care of the coal from its arrival in cars until it was delivered in the lorry bins—and it included labor, power and material and supplies for keeping the plant in good operating condition.

The Franklin washery was described and illustrated in *Coal Age* of July 20, 1912, in an article entitled "Byproduct Ovens, Johnstown, Penn."

In the United States the total bituminous coal production during 1917 was close to 542,000,000 tons and 90,000,000 tons of anthracite was marketed. The uses to which the bituminous coal were put have been estimated as follows: Stationary steam plants, 215,000,000 tons (40 per cent.): railway locomotives, 190,000,000 tons (35 per cent.); households, 135,000,000 tons (25 per cent.); total, 540,000,000 tons. Of the 90,000,000 tons of anthracite 40 per cent. was consumed by locomotives and 60 per cent. mostly by domestic users. Reference to the figures given shows that 60 per cent. of the total production of bituminous coal in the United States during 1917 was applied to non-productive uses—35 per cent. for steam locomotives and 25 per cent. for domestic use.

Transportation Situation in Middle West

Reporting on the coal transportation situation in the Middle West, Hale Holden, regional director for the Railroad Administration, says: "There are 14 roads reporting to this office, although not all are included in the Central Western Region, and the loading shows 202,658 cars in August as compared with 202,549 for the month of June and 220,701 for the month of July, and as compared with 150,940 in August, 1917. The extraordinary loading in July, which was the greatest in the history in this territory, following the unusual heavy loading in June, resulted in a production greater than the market in this zone could absorb, and the Fuel Administration was obliged to cast about for ways and means of disposing of this surplus which led up to: (1) Zoning coal from western Kentucky out of Illinois, Indiana and Wisconsin, (2) agreeing to furnish a larger tonnage for the Northwest, and (3) opening the State of Michigan to Illinois coal, which it is thought will absorb 600,000 tons of the surplus.

"In view of the surplus of mine-run and screenings from the Central Illinois field, there has been no complaint in regard to car supply. The surplus of poorer grades of coal will disappear by the middle or latter part of September, but the roads in this territory are prepared to meet any demand that the car supply in sight can possibly make. Our biggest problem therefore is keeping up a full car supply."

Suggests Use of Highways for Coal Movement

Recourse should be had to highways wherever feasible to supplement the transportation of coal by rail, is the opinion of Cyrus Garnsey, assistant fuel administrator. In a letter to the Highways Transport Committee of the Council of National Defense, he says:

"We are also convinced that transportation resources can be greatly increased and larger tonnage movement of coal from wagon mines direct to consumers effected by applying all possible vehicles, horses and the necessary labor in line with national policies promulgated by you, and operating over suitable highways constantly maintained in efficient condition. For this reason we ask that you convey to our field organization our very real interest in this part of their work and assure them we desire to support their organization to the limit in their efforts to effect greater tonnage movement of coal over the highways from wagon mines to consumer.

"We suggest also that whenever conditions of roads, local legislation, lack of suitable equipment, and so forth, tend to impede the most effective and efficient movements, you will promptly bring these matters to our attention. To expedite the handling of these questions the Fuel Administration has committed them to its Mine Track Committee, composed of Frank G. Jones, Chairman, Robert L. Ireland and S. A. Taylor."

Power Situation Affects Fuel Supply

Extracts from the conclusions of Chester G. Gilbert and Joseph E. Pogue, with regard to the power situation, have been made public by the Smithsonian Institution. Messrs. Gilbert and Pogue, who are members of the Institution's mineral technology staff, declare that:

"The righting of the power situation requires (1) the establishment of a comprehensive system of electric transmission lines to be administered as a common-carrier system like the railways. (2) The provision of such a system will necessitate the coördinated growth of central power stations in coal fields and at water-power sites, and in doing so will open to business enterprise a tremendous field of opportunity hitherto closed off from entry, and thus lead to the balanced development of the two major energy resources, coal and water-power. (3) The principle of multiple production, recognized and incorporated in national policy, will supplement the additional service gained through the organized employment of the electrical principle; applied to the production of coal-generated electricity, and, through the medium of municipal public utility plants, to the distributive employment of coal, this principle will effectively correlate the recovery of the commodity and energy values, so as ultimately to effect a full saving of the former and an increased gain of the latter, thus permitting a further relative diminution of the amount of fuel calling for transportation in bulky form. The first two points reduce themselves to a single issue, which is purely a business proposition to be handled by a business organization; the third item is more intangible and it is a matter of policy, which, therefore, cannot be delegated or otherwise handled in objective fashion.

"Thus specific action in respect to establishing a common-carrier system adapted to the power needs of the country will not only go far toward solving the problem of transportation, but it will improve the fuel supply, correct the economic fallacy of drawing upon capital resources while neglectful of income, contribute to the recovery of the values now lost in the consumption of raw coal, lead to an adequate development of electrochemical activities, cut off a needless annual expendi

ture running well beyond the billion dollar mark, and constitute a potent contribution in the direction of stimulating the upgrowth of a constructive economic policy of national scope attuned to the needs of modern industrial development. It is believed that these results would involve national economies, offsetting in large part the cost of the war."

Railroads Delay Shipments of Mine Timber

Considerable delay to mine props and mine timbers have resulted from the recent order from the Railroad Administration placing the movement of lumber on a permit basis. It was not the intention of the order to include mine props and timbers. Many of the railroads, however, have failed to differentiate between mine supplies and lumber which comes within the purview of the order. The telegraph is being used freely to secure the release of mine props which are sorely needed in many of the coal mining districts.

Fuel Administration Not Discouraging Recovery of Pyrites from Coal

The Fuel Administration took no action looking to the discouraging of the recovery of coal brasses from mines in the Middle West. When it was proposed to erect plants to treat these pyrites, the Fuel Administration simply insisted upon the precaution that the recovery of the coal brasses not be allowed to interfere importantly with the output of coal. The Fuel Administration suggested that the War Industries Board should allocate the production. It was feared that increases in the price of pyrites might make it more profitable to abandon the recovery of coal in favor of the other mineral. The Fuel Administration also suggested that the coal brasses extracted were to move in boxcars only.

Supplies for Mine Use Should Be Obtained from Local Sources

While every effort is being made to allow mine supplies to move without undue questioning, the Fuel Administration has found it necessary to stop all abnormal movements of supplies. Hay for use at a West Virginia mine, for example, was being shipped from Michigan. Another West Virginia company ordered a wagon from Orleans, N. Y. Officials here will insist that supplies be obtained from the nearest available source.

Coal Distributor's License Suspended

Distributors guilty of boosting the price of coal are being dealt with severely by the Fuel Administration. An example of the action being taken is the case of W. H. Blight, of Elmira, N. Y. He wrote prospective customers suggesting that he could secure coal for them if an additional 25c. per ton were forthcoming. The letter came into the possession of the Fuel Administration and Mr. Blight has been prohibited from transacting any coal business whatsoever for a period of sixty days.

D. D. Bush, of the Fuel Administration, is now engaged in working up the data, recently submitted by operators, on the steel requirements of the country's coal mines for the eighteen months prior to Jan. 1, 1920.

To Use Rejected Shell Steel for Chutes

That more chute steel may be provided, consideration is being given to a plan to work over rejected shell steel for that purpose. Shell steel is much too hard to make an ideal substitute for the regular chute steel, but as it can be made to do, it is probable that it will be gladly accepted. Fuel Administration officials are convinced that, with the present serious shortage of steel, it will be impossible to secure further supplies of chute steel at this time.

High Daily Average of Bituminous Miner

An example showing the possibilities of greater individual production is furnished by John Gulliver, of the Pleasant Hill mine of the Clearfield Bituminous Coal Corporation. In June, Gulliver loaded 270 tons, or a daily average of 10.41 tons of coal. In July, he loaded 288 tons, an average of 11.70 tons per day. In August, his output was 297 tons, a daily average of 11 tons. In August the daily average was 6.23 tons.

All records of the Pittsburgh district were broken last week when 130 out of the 134 blast furnaces in that area were in operation. The only four furnaces which were out of blast were being relined. This is quite in contrast with the situation early in February, when 38 furnaces were banked for want of coke.

Fuel Administration field men are reporting from many sections of the country greatly improved conditions as compared with this period of last year. They confidently predict that there will be no coal shortage this winter. Stocks already on hand insure a safe reserve for those periods in the winter when transportation tightens up.

Legal Department

EXISTENCE OF EMPLOYMENT RELATIONSHIP.—A teamster occasionally employed by a coal-mining company to make deliveries to customers, using his own team, cannot be said to have been an employee of the company while hauling a load of coal for his own account, so as to make the coal company liable to pay an award under the Indiana Workmen's Compensation Act on the man being killed, although it was understood that as soon as he had moved the particular load he would return and make a delivery for the company. (Indiana Appellate Court, Sugar Valley Coal Co. vs. Drake, 117 Northeastern Reporter, 937.)

LIABILITY FOR ACCIDENTS CAUSED BY SAGGING TROLLEY WIRES.—The Kentucky Court of Appeals has affirmed judgment in favor of a triprider injured while riding on an electric motor in a mine, due to sagging of the trolley wire when the wire broke at a nearby point. The injured man was declared to be entitled to recover on the theory that the breakage and sagging was caused by a worn condition of the wire which must have existed for some time and which would have been discovered before the accident had due care been exercised to maintain the wire in reasonably safe condition. The court approved the following statement of law given by the trial judge to the jury: It was the duty of the defendant coal company, if its wires carried a deadly or dangerous current of electricity, to use the utmost care and skill in the construction, management, and maintenance thereof, and it was the further duty to exercise and use the utmost care and skill to properly support the wires and to keep them in repair. (Key vs. West Kentucky Coal Co., 198 Southwestern Reporter, 724.)

THE LABOR SITUATION

General Labor Review

Events have crowded themselves into the last few days. The dissentients from the union in the northern anthracite field have declared themselves patriots and purged themselves of the crime of sedition by promising to await with due patience the ruling of Dr. Garfield in the matter of their wages. Then, again, Elbert H. Gary, chairman of the board of directors of the United States Steel Corporation, declared on Sept. 24 in favor of the eight-hour day. The men are to receive time and a half for overtime and double time for Sunday work. It is understood that the Lackawanna Steel Co., the Republic Iron and Steel Co., the Youngstown Sheet and Tube Co. and the Midvale Co. will follow suit. It appears likely therefore that the principle will be extended to the coal mines in which the steel corporations are largely interested.

Progress has been made also in the arrangements for the giving of badges for steady and meritorious service. It is highly important that some such action be taken promptly. Several companies have found that badges of their own devising have done excellent work, and doubtless far more efficient work would be done by the introduction of badges having national significance, especially if the presentation could be accompanied by the reading of a letter from the President such as he knows so well how to write.

It is much to be regretted that with the winter close at hand our good friends in the north are having so much trouble with labor. The difficulties seem to be arising everywhere except in Vancouver, where the shooting of the miner slacker Goodwin was expected to make trouble, but did not arouse much resentment in the miners. It appears, however, that all District No. 18 may go on strike to enforce a single-shift operation at one particular mine, despite all the promises made regarding legislation in favor of the single-shift operation of all mines. The Edmonton district has many men on strike and at the other end of the great Dominion, in Pictou County, Nova Scotia, there are all manner of strikes.

James Morgan is the chairman of the new union body which calls itself the "Anthracite Union" and has no affiliation with the United Mine Workers of America. It is said to have, so far, only 600 members. Talking about new unions, one has just been started by 80 petty officials of the Delaware, Lackawanna & Western R.R., Coal Department, the Lehigh Valley and the Lehigh & Wilkes-Barre Coal Co. They met in the Union hall at Wilkes-Barre and propose to band together the mine and firebosses who, because of their employing and discharging labor, can not become members of the United Mine Workers of America. They claim that they are discriminated against by reason of the fact that they have no union to enforce their needs and voice their demands. They receive straight salaries of $127 to $137 per month, but get no extra pay for overtime.

Upper Anthracite Region Not Pro-German

On Sept. 21 500 delegates from 70 local unions in District No. 1 (the northern anthracite field) met in convention in the Union Hall at Wilkes-Barre to protest by resolution against the general statement that they were tainted by pro-Germanism or by the evil spirit of the Industrial Workers of the World. Said they:

"We wish the world to know that we are not pro-Germans or I. W. W's or disgruntled obstructionists, but true and loyal American citizens and supporters of our great Government in anything it may undertake, as well as true and loyal members of the United Mine Workers and obedient to the wishes of its officials when said officials heed our demands and coöperate with the rank and file of the organization informing them by official communication of the progress made."

Then they add a promise in the words following to stand by Dr. Garfield as loyally as they do by the union if he will do what they desire:

"Whereas Dr. H. A. Garfield, United States Fuel Administrator, whom we honor and trust to give us justice when the facts are properly presented, has stated that we are entitled to an increase in wages and that he is now working on the amount to be granted as well as on the method in which to apply it, therefore be it resolved that we . . . pledge ourselves to be loyal to our great Government as we have been in the past, that we are bitterly opposed to any suspension of work pending the adjustment of our demands for an increase in wages and that we will do everything in our power to assist the Fuel Administration in the production of a maximum output of coal, and be it further resolved that we request the Fuel Administrator to alleviate the unrest in the anthracite region by naming a specified date when the increases will retract [to which the increases will retroact] and we believe that if this is done there will be no further trouble in the anthracite regions."

The 250 strikers at the Grassy Island shaft, the Grassy Island slope, the Olyphant and Eddy Creek collieries of the Hudson Coal Co. at a meeting held Sept. 17 at the Oliphant colliery voted to return to work. The men declare, however, that if an increase is not granted in ten days a second strike will be called.

The strike in the southern anthracite field is now completely at an end. It is computed that by their action the miners lost $200,000 in wages. The whole production of anthracite fell 11.3 per cent. Whereas it was 2,088,000 short tons the week before, it dropped to 1,847,000 short tons during the week of the strike. Fortunately the anthracite region only mines as much in a week as the bituminous region mines in a day. In other words, the bituminous output is six times the output of the anthracite region.

National Awards for Steady Work

The Department of Labor, as far back as May, 1917, began to consider the adoption of some form of insignia for the employees of plants engaged in filling Government contracts, the purpose being to show the public at large that the person wearing the insignia was doing his bit, at least in a degree, as was the man who was wearing the country's uniform.

The following rules and regulations concerning "The Issuance of War Industries Badges" have been drawn up by C. T. Clayton, Director of Training and Dilution, of the Department of Labor. The rules and regulations have been approved by practically all the employers of labor and by the employees themselves. All of the officers of the American Federation of Labor have approved these rules and regulations, but the national organization as a whole has not had an opportunity as yet to give its assent.

They have been presented to President Wilson for his approval and he also has been asked to write a pledge of loyalty which will be given to each candidate for the war-industries badge. The whole matter now awaits the approval of the President, upon receipt of which it will be given the widest publicity. The well-known New York artist Jo Davidson is engaged in designing the insignia.

Civilian war workers have long and generally felt that they were taking a vital part in the prosecution of the war

and were entitled to some recognition. Many of such workers, if they had their choice, would be at the front. For these reasons the Government has been considering the award of appropriate industrial insignia.

For the present it is proposed to limit the issuance of badges to civilian workers in those industries where a substantial proportion of the output is directly or indirectly required by the United States Government or by the allied governments and to such industries as are certified, by a competent Government agency, as essential. Care will be taken to exclude the concerns in any industry which are not actually working on Government or essential work. Wherever, from the mixed nature of the work or for any other reason a question shall arise as to whether the industry or the individual is entitled to the badge, the final decision shall rest with the Director of the Industrial Insignia Service.

The following service divisions have been established: Mining, war industries, shipbuilding (and ship repairing). Other divisions will be established as the need arises. A copy of his pledge of loyalty will be given on his enrollment to each candidate seeking the insignia, which the candidate will sign and the enrolling officer countersign. The pledge will also be placed upon the enrollment sheets; and at enrollment a description of the candidate's occupation, employment and nationality will be made out and a copy sent to the Director.

War workers shall be entitled to wear the War Industries Badge only if they work 100 per cent. of the established working hours in each month; less such absence as is involved in a customary vacation, or because of sickness or some other unavoidable cause. Candidates will be invested with the base of the badge, which contains the candidate's official number. At the end of four months' service each candidate properly adjudged to have complied with the standards will be awarded the primary disk. Upon the expiration of each further period of four months' service a new disk, indicating the additional service, will be substituted for the original disk, which forms the center of the badge. When the badge is introduced in any plant such workers as satisfy the administrative officers that they have complied with the rules for four months or more shall be immediately awarded the full badge.

For local administration there will be an enrolling committee of not less than three at each plant. One of the committee will be a person having authority in the corporation. He will represent the employer. The rest of the committee will be elected by the employees, one for each shop or department. The chairman of the committee will be nominated by the members, subject to the approval and appointment of the Secretary of Labor.

Such committee shall have the following powers and duties:

a. To enroll candidates for the War Industries Badge.

b. To ascertain the cause of absences or shortened working hours of any war worker who fails to work the prescribed periods, or to produce either in quality or quantity his fair proportion of output.

c. To decide to whom badges and indicia of service shall be awarded.

The names of candidates whom the committee think worthy of the badge or succeeding indicia shall be submitted to the employer before public announcement, giving him an opportunity to object to any name and to discuss the matter with the committee. In case of disagreement the matter will be referred to the Director for final settlement, a written statement of facts being supplied him as a basis for his decision.

Rules To Be Observed in Distributing Badges

a. Upon enrolling, each candidate will be entitled to the beginners' badge, which shall consist of the pin and bar foundation of the badge, without the indicative medallion, but bearing upon it the serial number assigned the possessor for use during the war; the badge and all indicia to become his property thereafter if not forfeited for cause before the close of hostilities (see rule d).

b. Upon enrolling, each candidate will also receive a card containing his name, address and other identifying information and a copy of the pledge, such card to be signed by the candidate and countersigned by the enrolling officer. Each candidate will be required to furnish a photograph measuring approximately 1½ x 1 in. and mounted upon the card. At the termination of each month's service, the card shall be presented to the committee for endorsement.

c. A war worker permanently disabled in service will receive a special disk, to be placed upon his badge, indicating that fact; such disk being public acknowledgment of the worker's patriotic service and honors.

d. Whenever a war worker desires to leave his employment for any cause, he shall surrender his badge to the committee. If he satisfies that committee that he has taken up war work elsewhere, the committee will grant him a transfer card, directed to the local committee at the new establishment; and upon presentation to that committee they will advise the first committee, which will redeliver the

KEEP IT BURNING

badge to the war worker through the committee at the new establishment. If the war worker has no new job in view, the committee at the establishment he is leaving will give him a transfer card directed to the nearest office of the United States Employment Service. Such card will entitle the war worker to especial assistance in securing other employment in war work. Upon placing the worker, the examiner-in-charge of the Employment Service office will notify the committee, or the war worker may apply through the committee at the new establishment, which shall notify the committee at the original establishment; and if the new employment has been taken up without unreasonable delay, in the judgment of the committee, transfer of the surrendered badge shall be made and due notice sent the Director.

e. The War Industries Badge will not be awarded to boys between the ages of 16 and 20 years, in localities where the Boys' Working Reserve training system is in operation. In

establishments having members of that organization, the committee will award to boys within the prescribed ages the Boys' Working Reserve Badge instead of the War Industries Badge, and such boys will be expected to become members of the Boys' Working Reserve and conform to the rules of the reserve regarding industrial education, which will be a part of the qualifications for award of their badge.

When such boys have earned the Boys' Working Reserve Badge they may on attaining the proper age be awarded the War Industries Badge in addition to the Boys' Working Reserve Badge, and that badge shall be given with indicia which will indicate the full period of service performed, including the service while earning the Boys' Working Reserve Badge.

f. The Government does not obligate itself to replace a lost badge or medallion. Should a member lose these, he can become a candidate for a badge only as a new worker. Any persons who may find a lost badge are requested to return it to the nearest local committee, which will forward it to the Director to be returned through his local committee to the person to whom it was first awarded. The badge is the property of the Government, and not for sale at any price; nor can it be given to any one except upon an award duly made by a regularly constituted committee, or upon a special award by the Director upon sufficient evidence justifying such action. The badge will remain until the close of the war the property of the Government, protected by the sanctions regarding unlawful conversion of Government property. If declared by a local committee to be forfeited, and the sentence is not reversed by the Director, the holder must return his badge to the committee for cancellation. If a war worker quits his job he shall return the badge to the local committee. (See rule d.) The employer is requested to assist the committee by taking up badges when he pays off war workers who are leaving his employment.

g. Appeal on any matter connected with badges may be made by any party to the Director.

RULES REGARDING THE CONFERRING OF BADGES

Badges should, whenever possible, be conferred upon candidates in groups or classes, with simple but impressive ceremonies. The members of the enrolling committee, headed by their chairman as an accredited representative of the President of the United States, should be present; the rehearsing of the pledge of service, the hoisting of the flag and delivery of a short address by some noted citizen with the formal conferring of the badges by a Government official or officer of rank should be elements of the program. The badge represents the honor and dignity of patriotic service, recognized by the Government of the United States. It is an American Legion of Honor; and no lack of respect should be shown in conferring it upon those who may earn the right to wear it.

Large Outputs of Patriotic Miners

We have received information regarding several big records of earnings and coal production. Some of these have been published, but they will bear collecting. Joseph Malachick drew $158.34 for two weeks' work at the Adelaide plant of the H. C. Frick Coke Co. His pay for four weeks was $300.96.

Harry Pyle, a miner employed by the MacGregor Coal Co. at the No. 1 Bando mine near Rockwood, Somerset County, earned $516.10 from July 15 to Aug. 16. As this period includes 26 working days, his earnings averaged $19.85 per day. The work for which he received the pay stated included the mining by hand of 410.26 long tons of entry coal, the lifting of 34 yd. of bottom at $2 per yard, the lifting of 10 yd. of bottom at $1 per yard and the working of two hours at 64½c. per hour. The coal mined by Pyle per day averaged 15.78 long tons.

The seam in which he worked was only about 4 ft. thick. He started the last half of August by mining 22, 21 and 18 tons in three consecutive days. Pyle is about 38 years old, and weighs about 165 lb. He is 5 ft. 10 in. in height. The mining rate figures $1.06 5|10 per ton.

The illustration herewith shows William Bumpus, a colored man, who is engaged by the Carbon Fuel Co. to load coal at its North Carbon mine, Decota, Kanawha County, West Virginia. In July he loaded 650 tons of coal and handled 70 tons of slate, yet he laid off three working days in that month so that he could work in his war garden. The coal he works in is the Eagle seam, which averages at North Carbon about 4½ ft. in thickness. Bumpus has always been a consistently high coal loader, but in July he distanced his own record. He is ready to defend that record and surpass it if Uncle Sam will furnish the necessary railroad cars.

WILLIAM BUMPUS LOADED 720 TONS IN A MONTH

Moundsville, W. Va., announces that one miner in that region, Charles Fogel by name, earned $169.89 for 11 days' work. One day in that period Fogel celebrated by loading 30 tons 17 hundredweight. He made $18.20 during that eight hours of work. The rate must therefore have been 59c. a ton, and the 11 days' record, 287 tons and 19 hundredweight or an average of 26.18 tons per day.

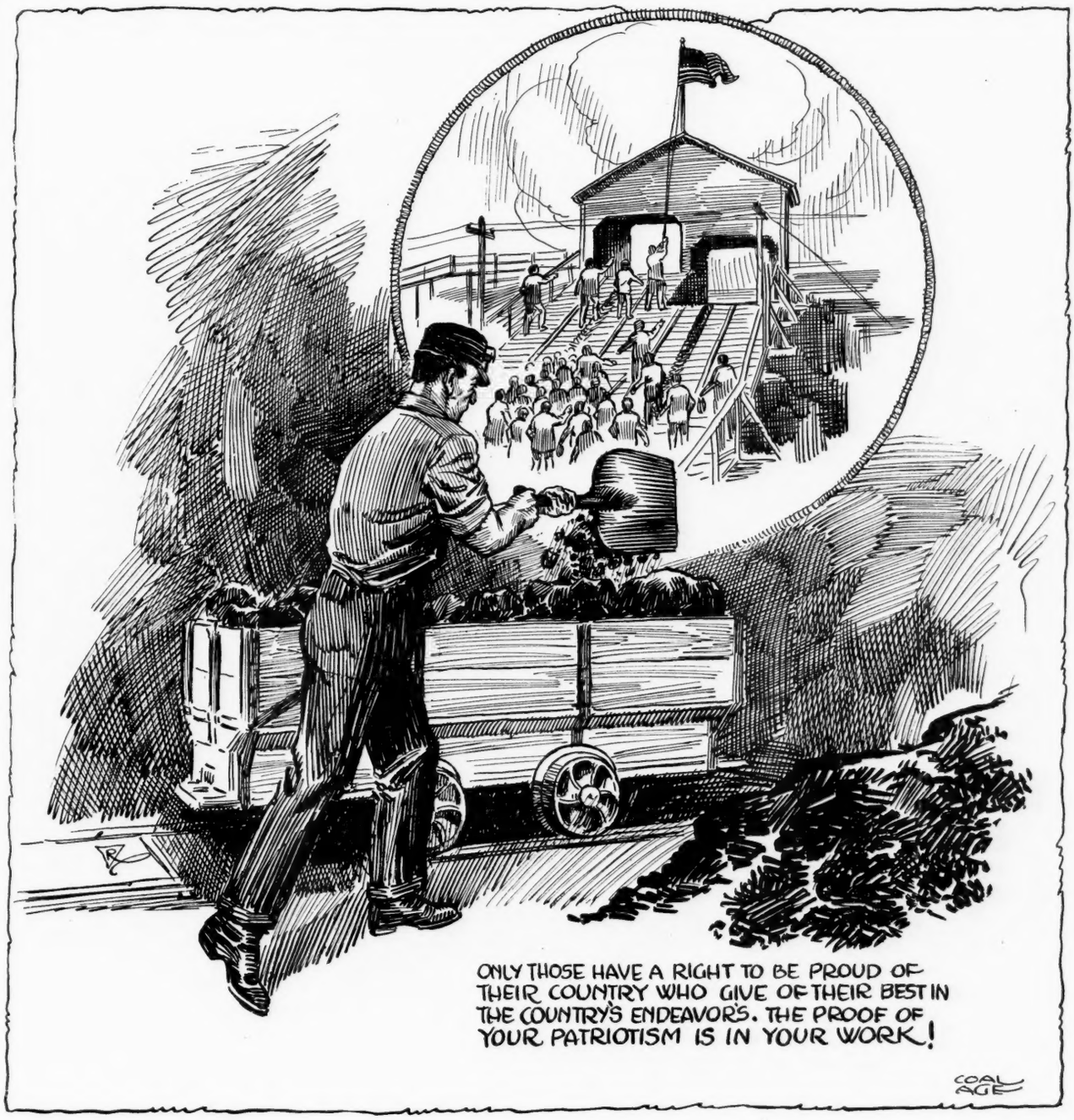
This beats even the records of Ed Blagg and Joe Swagda as recorded on July 6, 1918, on page 29 of *Coal Age*. It must be remembered, however, that Blagg was working in an entry and perhaps his coal was thinner, for it was only 3 ft. 8 in. thick. It would appear that the Bumpus record closely parallels that made by Fogel, if it is assumed that Bumpus worked 24 days in July and if his slate is figured as coal. His tonnage then would be 26.25 tons per day.

Other records are coming in which prove the industry and patriotism of our coal miners. John Mullins, a miner at Hemphill, Penn., who works for the Solvay Collieries Co., dug and loaded 691 tons of coal between Aug. 15 and Sept. 14, a wonderful record—25.59 tons a day on the assumption that he worked 27 days, the number of week days occurring in that period of time. The rate paid for mining appears to have been 65c. a ton, for the wage was $449.15.

Leave the Mines To Get Drafted

The operators of Illinois complain that the exemption of miners and other mine workers does not exempt. The younger men would rather fight than dig coal, and they find that while there is no direct route from the mine to the national service, indirect routes are not yet tightly closed. A man can always leave the mine and get employment at a factory making nonessentials, and from such a plant there is a wide-open door to the army and navy, which he accordingly enters forthwith by enlistment or draft. Many of the men thus leaving are drivers, and as a driver or motor runner will haul from 30 to 300 tons a day his absence causes more loss of tonnage than is caused by the absence of a coal digger.

The Flag at Your Tipple Means Nothing If You Have Not Its Service in Your Heart—Buy Liberty Bonds


ONLY THOSE HAVE A RIGHT TO BE PROUD OF THEIR COUNTRY WHO GIVE OF THEIR BEST IN THE COUNTRY'S ENDEAVORS. THE PROOF OF YOUR PATRIOTISM IS IN YOUR WORK!
COAL AGE

Pledges should be made in bunches. Do not make a pledge to buy Liberty Bonds without pledging yourself: (1) To earn by steady work and (2) to save by a frugal life enough money to pay for the bonds in a few months. He who works steadily makes materials for war, and he who saves his money saves material and labor which can be applied to the support of the fighting forces.

EDITORIALS

When Your Neighbor Is Angry

WHEN YOUR neighbor is angry it is his troubles and not he who speaks. Now more than at any time is the time for the operator, superintendent or foreman to keep this piece of plain fact, as a motto before his eyes, lest he flare up and make trouble with his employees that he will later regret. There is usually something back of an exhibition of grouchiness. In every instance let us try to find out what that something is, so that we can remove the trouble or at least assure our aggrieved neighbor that he does not help matters by his violent expression of anger.

It will help us, also, if when we meet with anger we forget the person who manifests it and fix our attention on the cause of the worry or trouble, on something impersonal. Nothing is more soothing than a keen diagnosis. It soothes us to regard the irascible man as a "patient" in the fell clutches of a disease or a circumstance. It diverts one's attention from his reactions of the "patient" and concentrates the mind on underlying causes.

Many a foreman appears to have an extremely irritable temperament. His language to the mine workers under his care is not warranted to make them friendly to him or to the companies employing him. So long as we load him with responsibilities and duties that one man cannot fill it will serve but little to counsel him to be more prudent and considerate. His troubles, and not himself, will continue to do his talking.

You surprise him at home with his family and find he is a pleasant, mild mannered man, with a devoted wife and happy children; but at the desk of his mine shanty he is like a caged lion. Relieve him of some of his duties, badger him a little less at the daily interview and give him a little wholesome advice of a sedative character and see him become bland and encouraging again.

The first duty of a superintendent is not to scold but to hearten a foreman, to give him a cheerful outlook on affairs that will help him to do his work without worry. Work without worry and work without fatigue should always be our aim. We almost never should pay a man to worry, and we should but rarely ask for work that would make an accustomed worker fatigued. A willing, ready worker is what we all want. What are we doing to make our workers both ready and willing? It can't be done by overexaction, because that inevitably produces worry, excitement, feverish action and ill-considered behavior. It can only be done by loading each man to capacity, forbidding him to accept any further duties, and by providing him with a good example of courteous consideration. A man who receives courtesies in the main office is likely to show courtesies in the mine office. An untroubled man is like a well-laid fish line, not likely to get snarled; but, like the line, when once he is disarranged, endless trouble is in store.

Why We Pay More for Cleaned Coal

THERE are not wanting people who claim that there should be no extra price conceded for coal cleaned by picking devices or passed over a picking table. They argue that coal should be cleaned at the face, and if it needs more cleaning it has not been properly cleaned by the miner. It is true that the miner should clean the coal before loading it into the car and should exercise judgment to keep dirt out of the coal, but when he has done all that is within reason he cannot produce a coal comparable with that cleaned at the tipple.

It must always be remembered that picking coal, even bituminous coal, is, for several reasons, an expensive operation—it takes labor, machinery and power, and also buildings to house the operation; moreover, it also removes a large part of the material for which the operator has already undertaken to pay, for the weight is taken before the waste material is picked out.

Of course, the operator can often use a portion of that waste. Little of it should be entirely incombustible; some of it will be "sulphur," or pyrites, which as fuel has a low thermal value; some of it is a coal high in ash but burnable. But whatever it is, its value is not equal to that of the coal which is to go to market, and the operator who takes it out needs to be recompensed for its loss, whole or partial, as well as for the labor involved in the systematic losing of it.

It has been contended that the operator who cleans his coal admits tacitly that he has neglected to keep his miners in line, and has permitted them to load dirt. All that can be said about this accusation is that, if this is true, in doing so he has wronged himself; for he must, in cleaning, throw away or use the rubbish his workingmen have delivered to him and do it all at his own loss of material and labor. No operator who begins to run a picking table relaxes in his efforts to keep the dirt in the mine. He is apt rather to be more active than before, as he keeps a closer record of his losses.

The extra payment made, therefore, for coal passed over a picking table or picking device is a payment that is earned. It is a return for money expended and for values actually lost. To fail to pay it would be to perpetrate an injustice. Like all injustices, it hurts two classes; in this case the operator and the public, for when the profit in cleaning coal is lost it will not be cleaned and the public will suffer accordingly.

"Do Your Bit"—What Do You Mean, "Bit"?

SINCE we entered the war the expression "Do your bit" has been freely used in America. Some people have remarked that it is a highly inadequate expression, and they wonder how it came to be so current in Great Britain, when the "bit" everyone was doing, whether rich or poor, was so amazingly large and entailed such a degree of self-sacrifice.

It is, however, but a small bit or share of the whole magnificent national endeavor that any of us can ever do. Work and struggle as we may, the action of the individual must always be dwarfed by the greatness of the effort of a hundred million of our people leagued, moreover, as they are with the legions of our Allies. Yet it is important that each of us do our "bit," our full share, and make our proper contribution to the whole result. We must all give to the great endeavor either in Liberty Loans or in taxes. Each can only do a bit; the more need therefore that each one does that bit that the whole aggregate effort may be worthy.

There are about 40 million wage earners in the United States, and they are asked to tackle a loan of six billions of dollars. The bit of the average wage earner is therefore $150. Remembering how greatly the receivers of large incomes are crippled in their purchasing power by unequal taxation, we cannot expect them to shoulder as much of the burden as they otherwise undoubtedly would. The amount of $150, therefore, does represent closely the bit or share demanded of the least of us, and those who make a good earning should put up far more.

Do not believe that any inherent honor exists in being born or admitted by naturalization into the citizenry of a great country with magnificent traditions. Those who were born to America could not help themselves; those who entered our country were accepted without any careful inquiry. The distinction is not in our citizenship, but in our patriotism. Our honor rests solely in the contribution we make to those splendid ideals and that glorious history that is America.

It is our "bit" that counts, that makes our citizenship an honor and not a disgrace. He who lives among a people born to honor and world service is not ennobled by that association, but is rather disgraced, if he cannot hold his head erect and fearless in that company.

Large then as the birthright we have received must ever be the service we render. Our "bit" must be big that we may rightly appropriate, each one to himself, the virtues of his ancestors and foster ancestors. It is useless for Æneas to proclaim that he has descended from the gods if he bemean himself like a swineherd. This is the hour of all hours at which we can show whether we belong or do not belong to our glorious past, if it is ours or another's—this America, this tradition. The Liberty Loan is only one of the many opportunities now offered us whereby we can prove the spirit and mettle of our souls.

The Question of Water-Power Development

FROM time to time in the past, but particularly since the introduction of proposed legislation into Congress for the provision of more power where needed, the question of developing the water-power of the land has been agitated. Many there are who now, through the press or from the stump, loudly proclaim that available water-powers, wherever located, should at once be developed, that the neglect of this source of energy is costing this country one of its irreplaceable natural resources, which should by all means be conserved.

Now, in a measure, all of this is doubtless true—but the perspective with which it is viewed is awry.

Great engineering feats are undertaken for one of two reasons—to tickle the vanity of some individual or group of individuals, or because they will pay. The pyramids, palaces, hanging gardens, temples, etc., of ancient times were examples of the former; the railroads, the bridges, the gigantic ocean liners of modern times are examples of the latter. Ask any banker to find capital wherewith to finance any industrial project and the question will be immediately asked, How much will it earn?

The present is an abnormal time wherein normal economic conditions are in many respects "sadly out of joint." It is inevitable, however, that a time will come when ordinary conditions will again prevail. At present the task before the American people is to at once and forever absolutely crush Prussian militarism. Whatever means may be necessary to this end must be employed, and this with as much speed and dispatch as possible. More power is needed for war manufacturing, and the quick way to get it is with steam-power plants.

So far as the wanton squandering of the nation's coal is concerned, about which so much is being spoken and written, all that can be said is that coal is being used for the generation of power purely and simply because it is the cheapest source of energy. It is true that water costs nothing, but the equipment necessary for its utilization costs much. Coal-power has held supremacy over water-power in the past and will continue to do so until economic conditions dictate otherwise.

To sum up, regardless of how fervently the editors of popular magazines or vivid "yellow" sheets may entreat, how eloquently senators and representatives may thunder, how viciously soap-box orators may rant, the water-power of the land now running to waste will be harnessed and made to generate needed energy just as soon as legal restrictions will permit and such development will pay a reasonable return on the money invested. It will not be done before.

No Covenanted Peace with Germany

AMERICA, unless we repudiate civilization and abandon humanity and put a premium on savagery and brutality, can make no covenanted peace, no peace by agreement or negotiation with Germany. It would be a covenant with hell, a partnership with infamy.

Nor would such a peace secure peace, except so long as it suited Germany. We can judge the future only by the past, and to Germany sacred treaties are scraps of paper only. Germany's whole history is a record of national treachery, national bad faith, national dishonor, national murder, and national infamy.

Of the old men and children murdered, of the women and girls ravished, of the noncombatants taken from their homes and deported to work for their conquerors, of the merchant ships sunk and passengers and crews murdered, of the hospital ships sunk, the hospitals and unfortified cities bombed, of the mutilation and murder by crucifixion and otherwise of wounded and captured soldiers—of all this beastliness there is plenty of evidence, evidence that no one can disbelieve.

The best answer to German peace propaganda is sinking more U-boats, sending more men to France, speeding up our work along every line, and a heavy subscription to the Fourth Liberty Loan. Peace must mean the triumph of right and justice, the defeat of Germanism, not a truce with it, not a compromise with it.

DISCUSSION BY READERS

Mine Rescue Work

Letter No. 3—I have been deeply touched by the reading of the two letters that have appeared recently in *Coal Age* (July 6, p. 32, and Aug. 8, p. 283), describing rescue work in mines. The accounts given recall to my mind the distressed faces of miners who were brought to the surface, after weeks of suffering in the dark chambers of the Courrieres mine, in France, following the terrific explosion of Mar. 10, 1906, when 1200 miners were lost in that death-dealing blast.

We did not have, at that time, the efficient breathing apparatus with which to enter the mine, and there came to our aid hundreds of Westphalian miners who had been well trained in the use of such apparatus in rescue work. Thanks to their help, the mine was entered and the work of rescue commenced.

As time went on and days passed without the rescue of many whose lives we had hoped would be saved, that hope was fast dying in our hearts. The company was claiming that all the men remaining in the mine were killed and argued that, to save the property from further damage by the fire burning in the mine, the workings should be flooded.

Remarkable Rescue of Entombed Miners

Just then, one committeeman who had fought this proposition from the start, claiming that there were miners still alive below, went down again and entered a certain air-course where he came upon the dead bodies of men that he was sure were not there on his previous visit. His report of this caused the rescuers to make renewed efforts, with the result that 20 days after the explosion, 13 men were brought to the surface alive.

The men rescued were in a pitiable condition, having lived on dead horseflesh for many days. They had found shelter in a stable where the afterdamp did not penetrate. One can imagine what joy the rescue of those entombed men brought to many waiting hearts. Again, five days later, Apr. 4, another miner, named Berton, was rescued. In reply to our inquiry asking how long he thought he had been in the mine, he said "eight days." He little dreamed that he had been down in those dark chambers 25 days.

The fact that such rescues have been made should prove conclusively that the deadly gases of the afterdamp often do not penetrate the entire workings of a mine, and there is always a possibility that trained men, with efficient breathing apparatus, will be able to reach men who still live, having barricaded themselves in a chamber to escape the fatal atmosphere filling the passageways of the mine. In the Courrieres disaster men were found in such positions as to indicate that death overtook them instantly, the afterdamp giving them no opportunity to escape, but this is not always the case.

Let us remember that the past good record of a mine for safety must not be relied upon to that extent that men cease to watch and use every precaution to prevent coming disaster. The Courrieres mine had the reputation of being a safe mine, but greater precaution should have been used as it was known that danger was near, owing to a big fire in progress, in an adjoining seam of coal. The day of the disaster a few miners refused to enter the mine, my cousin among the number, fearing the danger they had to face.

Let me suggest, in closing, that more attention should be given to planning the ventilation of a mine with a view to assisting, in times of danger, in the work of rescue. Also, let every effort be made to improve the types of breathing apparatus now in use. The Gibbs apparatus, developed by the Bureau of Mines, is a step in this direction.

GASTON F. LIBIEZ,
Peru, Ill. Mine Examiner.

Perplexities of Mine Foremen

Letter No. 1—It was with much amusement and a good deal of appreciation that I read the editorial entitled "Let the Operator Get On the Job," *Coal Age*, July 25, p. 185, but dealing with the perplexities of mine foremen. If there is an employee around the mines who comes in for more trouble, and who carries, or miscarries, greater responsibilities than anyone else in the mine, it is the mine foreman.

The description given in the editorial is true, every word of it. In the position he occupies as an officer charged with the carrying out of the mine laws, and as an official of the company charged with the management of the mine, the mine foreman is truly a cross between a "safety engineer" and a "mine manager." In the present crisis, the title "Mine Foreman" might be defined as applying to that official who is responsible for *"a maximum of production for humanity's sake."*

Early on the job, in the morning, his troubles begin. The machine runners have not cut the coal in many places, which must remain idle for the day, as the loaders in those places are going home. The outlook for the day's run is dark, but the mine foreman, though an ordinary human being, must grin and bear it, although he may give expression to his feelings by a few cuss-words, occasionally.

Eventually, however, if the man is worth while he masters the situation as best he can and the hoisting of coal begins. He then turns his attention to the supplies of timber and tracking ordered by the men, on learning that these supplies are short. His requisition sent to the office some time since has not been filled and the men must wait; but the foreman must keep the coal running. His problem is to hold the men in their places and be responsible for their safety, until the needed supplies can be had.

A good mine foreman knows that to produce coal many things are needed; it may be better tools, powder,

facilities for haulage are urged; a motor to take the place of several mules in a certain section of the mine, and other changes to enable him to put the required tonnage on the tipple.

Many excuses and promises are offered the mine foreman by the management in response to these suggestions, but the desired equipment is not forthcoming. Too often it happens that a wiser head than his has changed his requisition, in the office; and an inferior quality of material, or a different brand of supplies than that indicated are furnished, because of its cheapness. It is false economy to send material into the mine, supposing that the man who must use that material can get the same results, and assuming that he does not know the best brand and understand his own needs better than the man in the office.

Another source of worry for the harassed mine foreman arises when the superintendent is called to account for failure in tonnage or an increased expense sheet, or other matters of a similar nature, and passes it on to his man, "Friday," whom we all recognize as our friend, the mine foreman. The big chief may not get to the mines more than once a year, and his coming is the occasion for many annoying requests made to the superintendent, but which, eventually, fall as a burden on the shoulders of the foreman in the mine.

Lest it should be thought that I consider all mine foremen good and competent to fill the office they hold, let me say that I have observed many incompetent men in this position, both in anthracite and bituminous mines. A good foreman never acts as if he owned the mine, while a less efficient man will show his incompetency by the abusive manner in which he conducts himself, and the heedless way in which he rushes here and there about the mine, but accomplishes little. The incompetent man impresses you with the fact that he is *boss*, which is something seldom observed in a good foreman, whom the miners come to respect, knowing that what he says goes.

Mistaken Conception of Authority

Well do I remember a visit to a mine in the southern anthracite region, where I went, in company with a party of bituminous operators, to inspect a certain large mine. The superintendent of the mine was with us, while the foreman piloted use through the workings. If ever a foreman showed his incompetency, that man did, by his manner and his many attempts to display his smartness, while every instruction given to his men was accompanied by an oath.

The impression on the minds of the visitors was that the production of coal in that mine would be greatly increased by putting another foreman in charge. In my opinion, however, Murphy was only the victim of improper training. Perhaps, he never had a chance to make a good mine foreman of himself. He had never been shown the errors of his ways, or reasoned with by a superior in office; but had grown up as a weed.

Let us study the mine foremen who are under us, strive to lighten their load and make them better and more efficient men. They are really the mainsprings of our mines, being in daily and intimate contact with the men who mine and load the coal.

Let us realize that the lot of the foreman is a hard one and be ready to recognize the man who has an ambition to rise. Many a foreman has the natural ability to make a good superintendent; perhaps, even surpassing the qualities of the man who is his superior in office. No man can progress today, unless he is a man of the hour and continues to grow each day.

Philadelphia, Penn. OBSERVER.

The Miner and His Pleasure

Letter No. 4—Since our country entered the war, the coal miner has had little time or inclination to think of pleasure. The scarcity of coal, in addition to the patriotic feeling of the average miner whose chief desire is to serve his country at this time and stand behind the boy "over there," has deprived him of even the thought of pleasure.

In almost every window of the miners' homes throughout the anthracite field hangs a National Service Flag, having from one to four stars, in token of the number of boys who have gone out to answer their country's call. The abiding thought in every mind is "duty today, pleasure tomorrow."

Sometimes I think too much is expected of the coal miner. The many complaints registered against this class of workers leads the public to hold them entirely responsible for meeting the utmost demand for coal and guaranteeing the winter's supply. The charges that miners are frequenting the saloons and that liquor is keeping them from their work in the mines fail of justice to the average miner.

Saloons in Mining Camps Not Thriving

In most mining camps, today, the saloons are not thriving; many have been obliged to close their doors and their keepers have gone to work in the mines. It is a common thing to see, in the daily press, the charge of drunkenness, and the writer's invariable claim that this is the cause of the shortage of anthracite.

If the statement of Mr. Buttons, chief of the Department of Mines of Pennsylvania, in addressing the retail coal dealers, in Harrisburg, some time ago, is true, that "drunkenness among miners is the sole cause of 20 per cent. of the shortage of anthracite," why does the Government permit this evil to go on?

In my opinion, one of the chief drawbacks to coal production, in the anthracite region, is the low wages paid to the miners, as compared with the attractive wages offered in other lines of work. Scores of miners are leaving the mines every day to take up other work. While some mine workers are making good wages, the average is below that of workers in other industries.

Great Need of Stabilizing Wages

Wages and cost of living should go hand in hand. The one should form the basis for computing the other. It would be well for the Bureau of Labor to continue its investigations of living conditions in the coal regions, and either make an adjustment of wages or control the rising prices of living necessities. If the cost of the latter were stabilized wages could also be stabilized, and such an achievement would be a blessing to all industrial workers.

The Government has stabilized the prices of wheat. sugar and some other things, but the movement should be extended further. If the Food Administration, through its methods and influence, can exert a pressure

to restrain speculators and profiteers from boosting the prices of a few essentials it should be possible to control all necessities of living, in a like manner.

Some time ago, I saw an item in a newspaper quoting President Wilson as stating that "profiteering is yet a rampant evil." The statement should be an incentive to more energetic and effective efforts in restraint of such practice. Certainly, the adjustment of wages and the cost of living should be of vital concern to the Government, in the present crisis, with a view of holding the mine worker in his place in the mine.

Attitude of the Miner Toward the War

Since the "Work or Fight" slogan was created and became a national policy, the attitude of the average miner is expressed in the words, "I will work where they will pay me the most wages, or I will fight with the boys in France." Coal miners appreciate their importance as workers in an essential industry, but they do not like the idea of being entirely barred from doing their share of fighting; they are opposed to class exemption. They have proved themselves fighters and can be excused for their desire to be made part of the American army that will some day *tread the streets of Berlin.*

The coal miners are true to this government; and that fact is the reason why the anthracite fields today are short from 35,000 to 40,000 men. Notwithstanding this shortage, the production of anthracite has never been greater than in the past year. Any miner, foreman, superintendent or operator who is not doing his level best to increase the output of coal, today, is watched as a dangerous man—a public enemy.

Before closing, I wish to ask a question in regard to the granting of vacations in war time. From mine official to miner, everybody is assumed to give superlative service, doing the best possible. In peace time, I believe a vacation should be allowed every working man under the sun if the man is worked to his capacity. I believe that the human body is like a machine and needs time to rest for the repair of the system. The rest accorded to mine officials, by all large coal companies in the Wyoming Valley, is for the most part a rest for the brain. Is that needed any more than rest for the muscles of the body of a mine worker?

Some time ago, a young man, working in the Wilkes-Barre Court House, was granted a vacation of ten days. He went into the mine for his vacation and loaded 200 tons of coal, showing his patriotism. Men should be honest with themselves. War-time vacations should be for the upbuilding of brain and muscle and not simply for jollification and pleasure. President Wilson has said, "we must not think of pleasure, until after the war when we will all have a big time." MINER.

Kingston, Penn.

Loading Coal at the Face

Letter No. 5—Referring to the record of Ed. Blagg, as given in *Coal Age*, July 6, p. 29, where it is stated that he loaded an average of 23 tons of coal a day of 8 hours, during the month of May, when working in No. 1 mine of the Buckeye Coal & Railway Co., at San Toy, Ohio, let me say that, although this is a remarkable achievement, we have no right to doubt the truth of the statement. I have heard some men remark that it could not be done, but they are men who fail to recognize that conditions are not everywhere the same as those under which they are working.

Here in Kentucky, I can say with truth, it would be impossible to make the same record. In this field, the miner is required to work under roof conditions that are often bad, besides being obliged to pick out the bone and sulphur from his coal when loading it into the car. It is my belief that, when stating facts or describing work performed in the mine, we often fail to give the particular conditions that made such possible. Many who read the account do not realize the great difference in the conditions in many mines. Hardly any two coal fields are alike, and the work of loading coal depends very largely on these conditions.

In mines where I have worked in Williamson and Franklin Counties, in Illinois, there is about 7 ft. of good clean marketable coal, overlaid with a good roof. Compare the work of loading coal under these conditions, with that in mines in Indiana in the low-coal region, or in the low coal of the Hazard, Harlan, or Pineville districts of Kentucky, or in some of the mines on Coal River, in West Virginia, or the low coal in the New River district. In any of the districts just mentioned, a miner could not be expected to load as much coal as when working in a thicker seam and under more favorable conditions.

There are, however, some disadvantages in loading coal in a high seam. In most cases the height of the car, in such seams, makes it difficult to load the coal with the same speed. Also, the timbering frequently requires more time and the cars being heavier are not as easily handled as the smaller cars in low seams. But these difficulties do not restrict the loading of a large tonnage to the same extent as does the handling of a draw-slate, which is so common in the working of a low seam of coal. In most mines, the miner must do his own timbering and in many cases, lay his own track. The tonnage a man can load then cannot be compared with what he will load when most or all of this work is done for him, as in many mines in Illinois.

In one mine, at least, in Hopkins County, Ky., the company employs shotfirers, who drill and shoot the coal, and the loader has nothing to do but to load it into the cars. When a loader has loaded all the coal in one place, he goes to another where there is loose coal ready to be loaded. He will generally try to find a place where the coal is handy to the track so that he will not have far to throw it into the car.

Working Conditions Determine a Man's Tonnage

It is readily seen that a comparison of the tonnage per man, under these varying conditions, cannot be made with justice to all. In order for a man to load a big tonnage in a day, he must have his place cut regularly, the empties must be there for him to load, and he cannot be expected to do much timbering or tracklaying. In addition, he must have a good light and good air. In this field, all shots are fired at quitting time, which gives the miner a great advantage as compared with places where the shots are fired at any hour of the day.

Since reading the poster page, in *Coal Age*, giving the record to which I have referred, I have tried to keep tab on five miners who are average workers. I find that these men spend, on the average, one hour in drilling

and charging the hole and about 15 minutes in timbering their places, which leaves 6 hours and 45 minutes for loading coal, in a day of 8 hours.

About a third of this time, however, is wasted in waiting for empties, which leaves only about four hours and a half for loading. Watching these men closely, I found that it took about twenty minutes for them to push a car into the room and load it. The cars held a ton and a half of coal and, at this rate, they could load about twenty tons each a day if they kept at work.

This is not claimed to represent the average tonnage per man, in this field. In my opinion, it could be much increased if the loaders were given half a chance; but, in many cases, the fault lies with the operator who has not provided the equipment necessary to keep the coal moving. When the drivers do their best the mule power employed is inadequate to haul out of the mines all the coal the miners can load. The trouble is not in loading the coal, but in putting it on the tipple.

Cleaton, Ky. OSTEL BULLOCK.

Use and Location of Booster Fans

Letter No. 2—I was much interested in the inquiry of "Mine Superintendent," *Coal Age*, Aug. 8, p. 287, in regard to the proper location for a booster fan when changing the circulation, as proposed in the second figure on the same page. It is not stated whether there are any entries working outby from the 9- and 10-E and W entries off the 9- and 10-N entries, shown in his sketch.

In replying to this inquiry, I will assume, first, that there are other entries working outby from those shown in the plan submitted. In that case, the air in the ninth and tenth cross-entries could be increased by placing regulators in the outby section or sections, provided the circulation in those sections is in excess of what is needed.

The building of the overcasts at the mouth of the 9-E entry, and splitting the main air current at this point so as to provide separate circulations for these east and west entries is a good suggestion, as it will increase the quantity of air in circulation, since the air in each split will then have only half the distance to travel. My suggestion of placing regulators in the outby sections would, of course, increase the water gage and reduce the total quantity of air circulating in the mine; and it is probable this would offset the good effect of building the overcasts and splitting the air at the ninth and tenth entries, all of which must be carefully considered. Such being the case, the only thing remaining to be done is to increase the power producing the circulation or to install a booster fan.

Assuming that the 9- and 10-E and W entries are equally developed and the same number of men are employed in each section, the proper location of the booster would appear to be at the intake airway, near the overcast and before reaching the point of split. Since the return airway in this mine is also the haulage road, the fan cannot be located on that entry. By locating it on the intake airway near the overcast, it will have the effect of increasing the volume of air in both the east and west sections, without placing regulators in the outby sections, as suggested previously.

It is my opinion that a booster fan will work equally well whether forcing or exhausting the air. Its location on the intake or the return airway must be governed by the conditions. In this instance, the location on the intake is determined by the fact that the haulage is performed on the return airway. I am assuming, now, that the stoppings inby and outby from the booster are in good condition, as otherwise the air would leak through the stoppings, and the current inby from the fan would not all reach the working face. The result would be that the leakage outby from the fan would cause that air to pass through the fan again and again. The booster would thus do little more than churn the air.

Referring to the statement of the inquirer that he is "inclined to place the booster in the return current, either on the 10-E or 10-W entry," I fail to see how he would get any benefit from such an installation, even admitting that the fan would work better as an exhaust than as a blower, unless one of these sections is working more men than the other and requires more air. Where both sections are working the same number of men and need the same quantity of air in circulation, the location of a booster in one of them would not give that result.

In my opinion, the only way in which the booster, in this case, can be used as an exhaust fan would be to alter the arrangement and make the intake airway the haulage road. If the mine is generating much gas this should be done anyway, especially if the booster is electrically operated. Without making such change, as I said before, the booster should be located near the overcast and outby from the split.

EMPLOYING A "BOOSTER" INSTEAD OF A REGULATOR

I have assumed, as is required by the bituminous law of Pennsylvania, that the principal ventilator is located outside of the mine. If there are no workings outby from the ninth and tenth cross-entries, it is my belief that there would be no advantage in putting a booster fan in this mine at all. What is needed, in that case, is larger airways and better stoppings. If these do not improve the circulation, a larger ventilator must be installed. In my opinion, a booster fan should only be employed to get air into a long split or section of a mine, at such a distance from the fan that otherwise it would be necessary to introduce a regulator in the shorter air split, so as to force more air into the longer split.

I cannot agree with the statement, made in the reply to this inquiry, on page 287, that "the location of a booster fan must always be on the return side and the fan must be operated to exhaust the air from the intake, inby of the leak." It is not always a case of leaky stoppings when a section of the mine is poorly ventilated; I believe that the trouble is usually due to excessive resistance in that section or split. If it were entirely due to leaky stoppings, these could be fixed, in many cases, cheaper than a booster fan could be installed and operated. It is a difficult matter to reduce the length of a split or its resistance, and the only way to get more air into that split is to increase the resistance in other sections, or splits, or to install a booster fan in the long split.

RICHARD MAIZE,
Uniontown, Penn. Inspector of Mines.

INQUIRIES OF GENERAL INTEREST

Hauling Capacity of Storage-Battery Locomotives

I have experienced considerable difficulty in the operation of my storage-battery locomotive, which has failed to give me a full active 8-hour day on a single charging. The machine has a 300 ampere-hour capacity at 85 volts; and, as it is operating on a road where the grades do not exceed 3 per cent., it appears to me that this size of battery should yield a full day's work in our mine if suitable equipment is provided.

Thinking over the matter, I had concluded that the trouble is due cheifly, or wholly, to the fact that our mine cars, are the old plain-bearing type, the wheels being somewhat worn run hard. I believe that the excessive friction thus produced is an overtax on the locomotive, causing it to discharge or become very weak, after only about six hours of service.

I was, therefore, contemplating the purchase of new trucks or cars, equipped with the flexible roller-bearing type of wheels, which I have seen advertised in the columns of *Coal Age* for a considerable period. However, chancing to talk the matter over recently with a friend who has been operating mines for a number of years, he told me that I needed a larger locomotive, and stated that, in his opinion, the trouble would not be wholly overcome by the new type of equipment that I proposed to install. He was positive that the locomotive I was using was too small for the work.

Having observed the valuable and helpful assistance that has been afforded inquirers on similar problems through the columns of *Coal Age*, I would like very much to present my proposition and receive such advice as *Coal Age* and its practical readers are able to give. I know of no better plan of gaining valuable information than that presented by the wide circle of friends who contribute their knowledge and experience for the benefit of the industry. I hope that there will be many who have solved difficulties similar to my own and will be willing to give me the benefit of their experience.

Huntington, W. Va. OPERATOR.

We take pleasure in presenting this proposition for discussion, knowing that the broad field of practice represented by the readers of *Coal Age* will yield much helpful advice. We regret, however, that the correspondent has not given much data that are involved in such a problem and which are absolutely necessary to insure an intelligent answer to his inquiry.

While it can be stated with certainty that a great improvement will result from the adoption of flexible roller-bearing equipment, the capacity of the locomotive now in use to perform the required work cannot be told without a knowledge of numerous data not given, such as the weight of the locomotive resting on the drivers. condition of track, length of haul, weight of loaded trip, and last but not least the competency of the motormen. The only data given in the inquiry are the power-rating of the locomotive and the maximum grade of the haulage road.

It is possible, therefore, to offer only a brief suggestion based on the power of the motors, as determined from the given amperage and voltage under which the machine is designed to be operated.

In mine-haulage practice there are two general rules of estimating on the horsepower of a locomotive. One rule makes the effective wattage of the motors, per ton-mile-hour, practically equal to twice the tractive effort of the locomotive, expressed in pounds; and the tractive effort thus determined may be taken as one-sixth of the weight resting on the drivers, dividing by 2000 to reduce to tons.

Applying this rule, in the present case, assuming an efficiency of 90 per cent., the effective wattage derived from the amperage and voltage under which this locomotive is designed to operate is $300 \times 85 \times 0.90 = 22{,}950$ watts. For a speed of hauling of six miles per hour, the effective wattage per mile-hour is $22{,}950 \div 6 = 3825$ watts. Taking this as double the tractive effort of the locomotive gives for the latter.

$$\textit{Tractive effort} = 3825 \div 2 = 1912.5 \textit{ lb.}$$

Again, taking this as $\frac{1}{6}$ of the weight resting on the drivers, the weight of the locomotive available for haulage, in this case, is

$$(1912.5 \times 6) \div 2000 = 5.7, \textit{ say } 6 \textit{ tons.}$$

It may therefore be assumed that, if this locomotive is properly designed and its power properly proportioned to the weight resting on the drivers, the machine in use is a 6-ton locomotive.

Another rule, sometimes used in practice, makes the effective horsepower, per mile-hour, of a properly designed mine locomotive as 9.85 hp., per ton resting on drivers. For a speed of hauling of 6 miles per hour, the required effective power, per ton on drivers, would be $6 \times 0.85 = 5.1$ hp.

Applying this rule, the effective horsepower estimated on the given amperage and voltage, in this case, assuming the efficiency of the motor as 90 per cent., is $0.90\ (300 \times 85) \div 746 = 30.76$ hp. This effective power in a machine designed to haul at a speed of 6 miles per hour would call for a weight of $30.76 \div 5.1 =$ say 6 tons resting on the drivers, as found previously.

Finally, assuming a track resistance of say 15 lb. per ton, the grade resistance for a 3 per cent. grade being $3 \times 20 = 60$ lb. per ton, the total resistance opposed to the tractive effort of the locomotive is $15 + 60 = 75$ lb. per ton of moving load. The tractive effort being 1912.5 lb., the total moving load in this case is $1912.5 \div 75 =$ say $25\frac{1}{2}$ tons. Since this includes the weight of the 6-ton locomotive, the weight of the loaded trip is $24\frac{1}{2} - 6 = 18\frac{1}{2}$ tons that this locomotive would haul up a 3 per cent. grade, under the conditions assumed in the solution of this problem.

EXAMINATION QUESTIONS

West Virginia Examination (1918), Mine Foremen and Firebosses

(Selected Questions)

Ques.—Where would you take your air measurements and how and when would you enter them in the foreman's record book?

Ans.—The law requires (Sec. 64) that the mine foreman shall measure the air current, with an anemometer, at least twice each month, at the inlet and outlet and at or near the faces of the advanced headings; and shall keep a record of such measurements, in a book having a form prescribed by the Chief of the Department of Mines. The measurements should be entered in the book at the time they are taken, the entry being made with ink and dated and signed by the mine foreman as evidence that he has fully complied with the mining law of the state.

Ques.—State in detail what a miner should do on entering his working place and after the firing of each shot.

Ans.—On returning to his working place, after the firing of a shot, the miner should proceed with great caution. In the first place, he should not return until the air current has cleared away the smoke and gas produced by the shot, so that he can see clearly what is before him and discern the character of the roof above him. He must observe the condition of each timber and note if any of them have been misplaced by the shot. He must examine the roof carefully as he proceeds and be particularly cautious as he approaches the place where the shot was fired.

Before attempting to handle any coal for the purpose of loading it into the car, the miner must reset any timbers that have been misplaced by the shot, and examine carefully the face of the coal to see that there is no loose coal hanging and liable to fall. If the mine is generating gas, he must examine to ascertain if any fresh feeders have been struck and note if there is any increased outflow of gas from the coal. Having assured himself that the place is safe for work, he can proceed to set and load his car.

Ques.—Of what use are the following instruments, in and around coal mines: Anemometer, water gage, thermometer and barometer?

Ans.—The *anemometer* is used for ascertaining the velocity of the air passing in an airway, for the purpose of calculating the quantity of air in circulation at that point.

The *water gage* is used for determining the ventilating pressure per square foot of sectional area, at a point in the mine affording communication between the intake and return airways. Each inch of water gage corresponds to a pressure of 5.2 lb. per sq.ft. of section. The reading of the water gage marks the difference of pressure between the intake and return airways, at the point of observation, and shows the pressure required to circulate the air inby of that point. A water-gage reading taken on the fan drift shows the pressure required for the entire circulation in the mine, including the shaft.

The *thermometer* is used to ascertain the temperature of the mine, which is of interest in connection with the hygrometric condition, or the amount of moisture carried in the air. In other words, the capacity of the air for absorbing moisture in the mine and rendering it dry and dusty.

The *barometer* is used to observe the changes in atmospheric pressure, which suggest, to a greater or less extent, the gaseous condition of the mine. A falling barometer indicates a decrease of atmospheric pressure, which is liable to be accompanied by an outflow of gas from the abandoned workings, void places and other reservoirs of gas, in the mine or the strata overlying the openings in the seam.

Ques.—(a) What supplies are necessary in and around the mine, for the safe working of the same? (b) What is your duty and what would you do if these supplies were not on hand?

Ans.—(a) Supplies of timber, rails, tracking and all other material used in the mine, together with first-aid outfits, including stretchers, blankets, waterproof coverings, and suitable means for conveying the injured from the mine and giving them first-aid treatment should always be kept on hand at every mine, and be in a condition ready for instant use when needed. There should also be kept on hand a sufficient supply of tools and repair parts, powder, oil, etc.

(b) It is the duty of the mine foreman to see that all needed supplies are kept constantly on hand and available for use. In case supplies are not available at the mine, it is the duty of the foreman to notify the operator or agent of the mine, in writing, as required by law (Sec. 72), stating his inability to comply with the requirements of the law, owing to the lack of supplies. Sec. 39 of the law provides a penalty for any operator refusing to furnish the supplies necessary for the mine foreman to comply with the law.

Ques.—(a) What qualifications should a miner possess before letting him work alone? (b) What tools should every miner be required to have on hand in order to make his place safe?

Ans.—(a) Before any miner is permitted to work alone he should be required to demonstrate his ability to mine coal safely and to perform all the work required of the miner, including the timbering of his place and the shooting and loading of his coal. He must be able to detect the presence of gas, observe dangerous roof and be familiar with the mining laws and the mine rules and regulations relating to safety.

(b) In addition to the miners' tools, such as picks, drills, tamping rods and needles when the shots are fired by squibs, every miner should have an axe, saw

COAL AND COKE NEWS

Harrisburg, Penn.

With a view to drafting a comprehensive and fair standard of rates for insurance carried by coal operators under the compensation act, and especially for the anthracite operators, a conference was held in Wilkes-Barre on Sept. 19, with operators, officials of insurance companies, mine inspectors of both the bituminous and anthracite fields and officials of the State Department of Mines. The need for readjustment of insurance rates under the compensation law has existed for several years, as anthracite operators and the Associated Companies have protested that the standards now set apply only to the soft coal regions.

The conference, which was a lengthy one, and included the presentation of many technical statements and reports, revealed that during the several years since the schedule was made up safety appliances and methods in the mines have been so improved that some decrease in the rates may be expected.

One of the most important questions taken up was whether or not the State Department of Mines would consider an anthracite mine as "nongaseous" if no gas had been found in a mine for a period of one year or more. If they would approve this, the Insurance Companies stated that they would allow the mine to receive the "non-gaseous" rate. The Chief of the Department of Mines, Seward E. Button, stated that while only a section of a mine may give off gas, it was the custom to class this as a "gaseous mine." He contended that a mine may not generate gas for two or three years, yet a pocket of gas could be found at any time, and cited many instances to prove his contentions and would not agree that the Department of Mines should class a mine as "nongaseous" when it was possible that gas might be found any day.

An effort was also made by several insurance companies to exclude the use of the Davy lamp in the schedule, but nothing definite was decided and will not be for some time. A slight decrease of rates is looked for.

Investigation of all workmen's compensation awards commuted or permitted to be made in a lump sum payment to a Pennsylvania workman permanently injured in an accident will be made by the workmen's compensation Board.

The Board has announced it will discourage lump-sum payments of compensation, excepting when the claimants desire to use such commuted funds in the purchase of artificial appliances or for occupational training to equip themselves for their old tasks or a new occupation.

The census ordered by the compensation board to obtain the histories of all commuted cases during 2½ years that the board has been in existence is the first action of this kind taken by any compensation board or industrial commission of the United States in an effort to replace permanently disabled men in industry at proper tasks. It is believed that a large percentage of these cases can, by proper direction be returned to industry at a benefit, both to the injured men and to industry itself.

Holding in effect that an employee who has finished his work remains under the provisions of the compensation act until he has left the plant or property of his employer, Judge O'Boyle (Luzerne County) by an interesting opinion on Sept. 23 reversed the judgment of the Workmen's Compensation Board in the case of Bridget Tigue against the Forty Fort Coal Co., and directs compensation for the plaintiff in the sum of $1543.

The case is rather unusual. William Tigue, late husband of the plaintiff, was employed as a miner in the Forty Fort colliery of the defendant company and on Dec. 18, 1916, while walking from the shaft toward his home within the inclosed colliery yard of the company along the railroad used regularly by himself and other employees, was struck by a locomotive of the Lehigh Valley R. R. and killed.

When the case was first submitted to the referee he found for the plaintiff that she was entitled to compensation, but the Compensation Board on appeal reversed the decision of the referee, and then the case was sent to the court for a ruling.

The company denied liability because the decedent was not in the course of his employment when killed and that his death was not due to the condition of the defendant's premises, but to the Lehigh Valley R. R. engine. The court, however, holds that Mr. Tigue was doing something in the course of his employment from the moment he entered the inclosure on his way to work until he left the premises and got outside the inclosure on his way home, and that his death was due to conditions on the premises of the defendant company.

Uniontown, Penn.

Responsibility for providing fuel of such quality and in such quantity as to keep the blast furnaces operating at maximum capacity during the coming winter was squarely accepted by 300 representative operators of the Connellsville regions at a meeting here which was addressed by high officials of the United States Fuel Administration. By formal resolution the operators authorized the fuel chiefs to deliver personally to President Wilson upon their return to the capital a message to the effect that "the furnaces shall not bank because of lack of production of the Connellsville coal and coke region."

While the output of the local regions has shown a steady improvement since the perfection of Production Manager Byers' organization the program of that department calls for an increase of approximately 75,000 tons weekly by the middle of October. Mr. Byers announced at the meeting that the regional fuel administration had set the second week of October as the banner week of the year, and that an output of 800,000 tons was the goal of the fuel drive.

Fuel production for the week ending Sept. 14 exceeded all previous records of the region, showing an increase of 18,400 tons in coal over the previous week, which had also established a new record. The coke production for last week was 346,958 tons and the coal output was 216,184 tons. Reduced to terms of coal the total production for the region was 736,621 tons.

An outline of the fuel administration distribution department, as well as the reasons for establishing a rigid inspection of all coke shipments, was given by J. D. A. Morrow. Although there are 46 more blast furnaces now than a year ago, he declared, the steel output will be 4,000,000 tons less. That situation was mainly brought about by lack of quality in the coke, and he warned the operators that no action would be too drastic for the fuel administration to take to correct that evil. He talked in very plain language and his meaning was unmistakable.

Charleston, W. Va.

Much tonnage was lost in the Pocahontas and Tug River districts during the week ending Sept. 19 mainly because of labor shortage. The loss due to car shortage was only 2052 tons, while labor shortage caused a loss of 52,271 tons. The total tonnage produced during the period already mentioned was 433,013, representing a decrease of about 5000 tons as compared with the previous week. Coke manufactured was about the same as for the week previous, or 49,829 tons. Efforts are being made to take up the slack at the mines because it is getting to be too often the case that miners in the Pocahontas and Tug River Districts fail to work up to capacity.

The greatest drawback to increased production in the Fairmont District is the late placement of cars, which seems to have now become a chronic condition in that field. For instance, last Saturday (Sept. 21), while the district was furnished with 1142 cars at 7:00 a.m., only 621 cars had been placed by the B. & O. The car supply itself has been none too good, not averaging much over 1200 cars a day, which is below the maximum requirements of the district. The production in the district as a whole has also been curtailed by an order issued which makes it impossible for team track loaders to get any cars at all for loading coal. They are not even to be allowed to load cars emptied on an agent siding. The order has completely paralyzed operations of team track loaders in this section. Complaint is made by mines in the district and specific instances cited showing that cars have been taken from coal operators and sent to plants for the loading of non-essentials. For three days last week there were no placements of cars on the M. & K. R.R. Twenty-one coal mines and four coke ovens with a capacity of 110 cars, in the Preston-Monongalia field, were shut down because of such a car shortage.

Coal production in the Winding Gulf district for the week ending Sept. 14 totaled 123,471 net tons, an increase of 6734 net tons over the previous week. This is regarded as satisfactory in view of the holiday loss. Still further production gains were scored during the week ending Sept. 21 in the New River and Winding Gulf fields, the increase for the combined districts being in the neighborhood of 5000 tons. Results are being achieved in the movement for increased production under the direction of E. E. White, production manager, and continued increases in production are expected by coal operators.

Though the New River district mines had a 100 per cent. car supply last week, production was seriously curtailed when a large number of the miners took a day off on Monday the 16th to hunt squirrels. Two-thirds of the miners out of one mine alone, as an instance, were absent from their posts.

Had all the mines in the Kanawha region reported this week it would have shown a total production of over 200,000 tons. With reports from seven mines lacking, the officially reported total production was 196,587 tons, representing an increase of 8000 tons reported over the preceding week, the hours required to produce such a tonnage being 5847. Car shortage has been reduced to 359 hours and labor shortage was only 675 hours. Mine disability represented a loss of 489 hours. While the car supply was not 100 per cent. it was almost that.

Birmingham, Ala.

Greatly improved output of coal in the Birmingham District during the next few weeks is expected, due to full resumption of mining operations at the Lewisburg mines of the Alabama Co., renewed efforts of the Railroad Administration to satisfy the full car demands of the mining interests here, and the efforts of the miners to turn out greater supplies of coal.

Coal production during the week of Sept. 21 promises to show greater increase than that for any week in some time, for the reason that the low water mark was reached during the previous week, when only 385,621 tons was the reported coal output of the district's coal mines, according to figures compiled by the local office of the Fuel Administration. Production for the week just ended is estimated at 395,000 tons, roughly. Experts say the output should not drop below the 400,000-ton mark in the future, and the 450,000-ton mark is confidently expected for future weeks.

Mining operations have been begun at the old Bamford mines, which have lain idle for the past twelve years, with Birmingham operators in charge. The coal at these mines is of a good grade and runs from three to five feet. The mine was found in workable condition after long idleness, but the new owners have put in many improvements, including a new spur track to the main line of the Southern R.R., from which it is only a 12-mile haul to Bessemer. It is understood that the entire output of the mine has been contracted for.

Tonnage figures for coal production during the past two and a half months are as follows, by weeks: Week ending July 13. 412,478; July 20, 415,653; July 433,738; Aug. 3, 417,462; Aug. 10, 427,718; Aug. 17, 411,035; Aug. 24, 430,311; Aug. 31. 390,413; Sept. 7, 392,939; Sept. 14, 385,621.

Dallas, Tex.

About a score of new coal mines are to be opened in the McAlester-Wilburton coal fields, according to reports in McAlester, Okla., following the action of the War Industries Board in approving the applications of these companies. Something like 700 applications for authority to open new coal mines were made to the War Industries Board by operators in the McAlester-Wilburton section, and of this number only about 20 were approved.

The first report from Washington that the War Industries Board would frown on the establishment of new industries was followed by a period of marked inactivity, for there was an inclination to take this order at its face value without investigation. Later it was explained that the desire of the Board was to encourage all essential industries, particularly the production of coal, and that steps should be taken at once to place details of the proposed new development before the Board for formal action. Then followed a period of marked activity during which the propositions for the opening of many mines were placed before the Board.

The War Industries Board in acting on these propositions has explained that the mere production of coal is not all that is required to get approval of a proposal to open a new coal mine or to develop idle coal lands. The quality of the coal must be considered, the labor supply available for operating the coal mine without interfering with other essential industries, ability of the railroads and other transportation systems to move the coal from the mines to points of consumption, and finally the amount of coal that can be produced from the proposed mine, are factors that largely determine whether or not the new mine will be allowed to be developed.

Lack of transportation facilities was the chief reason for the disapproval of the applications from many of the Oklahoma concerns, and poor quality of coal to be produced ranked as a second reason for refusal.

PENNSYLVANIA

Anthracite

Sugar Notch—Two members of the surveying corps for the Lehigh and Wilkes-Barre Coal Co., while working in the No. 9 colliery of the company on Sept. 20, were burned when an open lamp ignited a pocket of gas.

Avondale—Four employees of the Delaware, Lackawanna & Western Railroad Co. were burned by an explosion of gas on Sept. 20, shortly after the beginning of operations. The two laborers had stood a set of timber near their chamber the night previous and were placing "cogging" about it the next morning. Shortly after the miner entered with a naked lamp and, encountering a pocket of gas, the lamp exploded, burning the men severely. They were all removed to the State Hospital.

Lattimer—Complaint was made on Sept. 23 by coal companies that the agreement which was drawn up this summer that one war industry would not recruit new hands from another plant engaged in Government work is being violated. C. Pardee & Bros. charged that their staff of miners has been raided and that nine have been located in a war plant nearby. The War Labor Board will be asked to act.

Hazleton—Despite the heavy rains in the past week the anthracite coal mines in the Lehigh region have not been affected by high water, and production has not been interfered with to the least extent. The precipitation was so gradual that pumps were fully able to handle the situation. The rains have refilled reservoirs that were low and there is no further scarcity of water anywhere throughout the district.

While wartime prohibition does not become effective until July 1, this town is already feeling the effects. So far this month (Sept. 22) only eight men have been arrested by the police on charge of intoxication, a record of which Mayor Heidenrich said he feels proud. Usually arrests for this misdemeanor exceeded all others, and were especially numerous around paydays at the mines. The falling off is attributed to the spread of the "dry move" and the high cost of liquor as a result of wartime conditions.

Mauch Chunk—The Lehigh Coal and Navigation Co. is planning for the reopening of the abandoned anthracite mine near Summit Hill.

Bituminous

Pittsburgh—The plant of the Orenstein-Koppel Co. at Koppel, Beaver County, Penn., has been sold by Alien Property Custodian Palmer to W. A. Chamberlain, auditor of the Pressed Steel Car Co. for $1,312,000. The 3000 shares of stock held by the German interests were sold to Hamilton Stewart, representing the Mellon interests of Pittsburgh, for $100.75 per share.

Uniontown—G. S. Harsh, L. W. Fogg and John A. Thompson, receivers of the Tower Hill-Connellsville Coke Co., have finished their labors and turned the property back to the stockholders of the corporation. J. R. Nutt, of Cleveland, Ohio, treasurer of the company, acknowledged the return for the corporation.

Greensburg—Joe Petris and Steve Stanton, firemen, were killed and two others are seriously injured as the result of a boiler explosion in the power house of the Westmoreland Coal Co. at Rillton, near here. Four boilers exploded and the escaping steam filled the boiler house. Other boilers remained intact and heroic workmen kept up steam to run the cages in order to hoist the 300 workmen from the mines. Repairs are rapidly being made and work will be resumed in a few days.

Black Lick—The Jewel Coal Co., controlled by men from Indiana, are constructing a siding, tipple, etc., preparatory to making shipments from its mines near Josephine. An incline plane will be constructed from the mine to the tipple and it will be necessary to build a two-span bridge over Black Lick creek to reach the railroad siding. The mines are now operating with a capacity of about 200 tons per day, the coal being hauled by teams and trucks. The capacity will be doubled upon completion of the tipple. Shipments will be made from the Cresson branch of the Pennsylvania Railroad.

WEST VIRGINIA

Bluefield—All office and store employees of the Panther and Lathrop Coal companies, operating in the Pocahontas field at this place, have entered into an agreement to go into the mines each and every Wednesday night to help load coal as a war measure and to donate the proceeds from such work to the Red Cross. This action was the climax to a meeting of the miners of the two companies held to name representatives of the miners on production committees.

Charleston—Such rapid progress has been made on the construction of the plant of the Big Bottom Coal Co. at Tad, on Campbells Creek, that the company will be able to begin the mining and shipment of coal in about ten days. The general manager of the new company is J. S. Cheney, of Charleston.

Dingess—The first coal company to be closed in district No. 9 on account of loading dirty coal is the Chafin and Hatfield mines at Dingess. This operation was closed by orders of the National Fuel Administration, effective Sept. 21. Numerous complaints were received by the consumers and manufacturing plants because of the bad quality and low grade of coal sent out by some of the mines, and as a result the announcement was made that after a certain number of offenses the mines found guilty would be closed. This suspension will remain until otherwise ordered by the Government.

OHIO

Athens—The labor train arranged for by the Buckeye Coal and Railway Co. to run from Athens up Bailey creek to supply a number of the company's operations in that field has been started by the Hocking Valley Railway Co. It required a month for the railroad company to find the three passenger cars necessary after the running of the train had been approved.

KENTUCKY

Hazard—Fire destroyed the power plant of the Hazard Coal Co. on Sept. 21, it being reported that the loss was heavy. The company will rebuild immediately.

Henderson—The Louisville, Henderson & St. Louis Railroad Co. on Sept. 23 lost a coal tipple valued at $10,000 in a fire at Henderson, which is supposed to have been started by rail tramps who had been sleeping in the tipple.

TENNESSEE

Chattanooga—The Chattanooga Iron and Coal Co., Chattanooga, Tenn., suffered severe damage to the engine room and dry blast tower when fire started in the oil storage room and spread to other sections of the plant.

ILLINOIS

Marissa.—The Aluminum Ore Co., of East St. Louis, has been leasing coal lands in the Darmstadt neighborhood between here and Lenzburg, with the intention of establishing a mine and operating it for a fuel supply for its big plant.

O'Fallon.—Samuel Meister, of Bay City, Mich., has been obtaining options on coal lands in this vicinity for a new company which is planning to take over and operate the mine formerly known as the O'Fallon Coal and Mining Co. Meister is offering $50 a ton for the coal rights and 5c. a ton for all coal hoisted.

Freeburg.—The Mulberry mine, near here, has been purchased by a newly organized company, the New Era Coal Co., which has been incorporated at Springfield with a capital stock of $25,000. The incorporators are H. B. Kooser, T. H. Gorman, L. Weiler and F. A. Friend, all of St. Louis. The mine employs about 100 men.

Oglesby—The Oglesby Coal Co.'s mine has been closed under an injunction issued by Judge Sanborn of Chicago. The injunction, which is a permanent one, was granted to prevent mining under the property of the Marquette Cement Co.'s property. The closing of the mine came as a great surprise to the officials of the mining company, especially at a time when the production of coal is being speeded up over the entire country.

Personals

E. W. Hoffman has resigned his position as superintendent of the mines of the Meco Coal Co. on Yellow Creek, near Homer City, Penn.

M. J. Zuby, formerly mine foreman for the Tide Coal Mining Co., at Tidedale, Penn., has been made superintendent of the mines of the Meco Coal Co. near Homer City, Penn.

Frank Farrington, president of the United Mine Workers of Illinois, was married Sept. 19 to Miss Alberta May Applewhite, at her home, 20 Campbell Ave., Indianapolis, Ind.

Eugene Jenks has been promoted from chief engineer of the Cowanshannock Coal and Coke Co., at Yatesboro, Penn., to superintendent of the No. 5 mines of the same company at Nu-mine, Penn., to succeed William Craig, resigned.

G. W. Colson, general manager of the Logansport Coal Co., Logansport, Penn., has been appointed general manager of the Pittsburgh & Allegheny Coal Co. and Pittsburgh & Clarion Coal Co. Mr. Colson has had considerable experience both in the United States and in European coal fields.

Thomas Bevan, of Scranton, Penn., has been appointed by W. W. Inglis, vice-president and general manager of the Delaware, Lackawanna & Western R. R., as general storekeeper of the coal mining department. Mr. Bevan was for seventeen years connected with the electrical department of the coal offices.

A. J. Case, formerly mine foreman of the Lucerne mine of the Rochester and Pittsburgh Coal and Iron Co. at Lucerne, Indiana County, Penn., has been promoted to superintendent of the Jacksonville mines Nos. 1 and 2 of the Jefferson and Clearfield Coal and Iron Co., at McIntyre, Penn., to succeed H. B. Stamper, resigned.

Obituary

Jack H. Morrison, aged 49 years, member of the firm of the Central Coal and Coke Co., of Carson, La., and superintendent of this company's properties in Louisiana, died at San Angelo, Texas, on Sept. 19, following an attack of appendicitis. Mr. Morrison at the time of his death was a member of the Government price-fixing committee on lumber.

Lieutenant George T. Rodgers, of Headquarters Company, 110th U. S. Infantry, was killed in action in France July 29. He was formerly a member of Company F of the Old Tenth Regiment of Pennsylvania and was promoted to a First Lieutenant before going over. At the time the United States entered the war Rodgers was division engineer of the Jefferson and Clearfield Coal and Iron Co., with headquarters at Indiana, Penn. His home was in Brookville Penn., and his mother and one sister survive him.

Publications Received

Petroleum: A Resource Interpretation. By Chester G. Gilbert and Joseph E. Pogue. Smithsonian Institution, United States National Museum. Bulletin 102, Part 6. Illustrated, 74 pp., 6¼ x 9¾ inches.

The Diesel Engine, Its Fuel and Its Uses. By Herbert Haas. Department of the Interior, Bureau of Mines. Bulletin 156. Petroleum Technology No. 44. Illustrated, 122 pp., 6 x 9 inches.

Annual Report of the Minister of Mines for the Year Ending Dec. 31, 1917. An account of mining operations for gold, coal, etc., in the Province of British Columbia. Illustrated, pp. 485, 7½ x 10½ inches.

Trade Catalogs

Pneumatic Rotary Dump for Mine Cars. Wood Equipment Co., Chicago, Ill. Bulletin 180. Pp. 12; 8½ x 11 in.; illustrated. Shows some typical installations of the pneumatic rotary dump and gives many reasons why the use of the dump improves mining conditions.

Type FK-20 Oil Circuit Breakers for Industrial Service. General Electric Co., Schenectady, N. Y. Bulletin 47,433. Pp. 16; 8 x 10½ in., illustrated. The circuit breakers described and illustrated run up to 300 amp. and 2500 volts, and are intended primarily for use with induction motors in industrial applications. Under proper supervision they may be used in coal mines.

The Gibbs Oxygen Breathing Apparatus. Mine Safety Appliances Co., Pittsburgh, Penn. Bulletin O-104. Pp. 20; 6 x 9 in.; illustrated. An interesting booklet containing an account of the development of the Gibbs apparatus, and listing the general requirements with which an efficient breathing apparatus should comply. The Gibbs device has been adopted for use by the U. S. Bureau of Mines and is made in America by American workmen.

Watt Cars—Mining and Industrial. Watt Mining Car Wheel Co., Barnesville, Ohio. General Catalog. Pp. 156; 8½ x 11 in.; illustrated. A splendidly prepared catalog, and one beyond criticism from any point of view. The typography, illustrations and paper are of the finest. Many of the company's most successful types of mine cars are described. The catalog is divided into five sections, embracing mining cars, industrial cars, ore cars, wheels and couplings.

Coming Meetings

Coal Mining Institute of America will hold its its annual meeting Dec. 4 and 5 in Pittsburgh, Penn. Secretary, H. D. Mason, 911 Chamber of Commerce Building, Pittsburgh, Penn.

American Institute of Mechanical Engineers will hold a meeting of the Middle West sections on Oct. 25 and 26 at Indianapolis, Ind. Secretary, Calvin W. Rice, 29 West 39th Street, New York City.

Recent Coal and Coke Patents

Furnace Grate. H. O. Dorsey, Atlanta, Ga., 1,274,147, July 30, 1918. Filed Nov. 14, 1917. Serial No. 201,965.

Smoke Consumer. T. Parobi, Dundee Lake, N. J., 1,273,402, July 23, 1918. Filed Apr. 13, 1917. Serial No. 161,697.

Dump-Car Construction. H. S. Hart, Chicago, Ill., 1,273,853, July 30, 1918. Filed May 24, 1918. Serial No. 236,275.

Coal Mining Apparatus. H. A. Kuhn, Pittsburgh, Penn., 1,273,504, July 23, 1918. Filed May 18, 1914. Serial No. 839,331.

Coal Mining Device. J. F. Joy, Belle Vernon, Penn., 1,273,869, July 30, 1918. Filed Sept. 22, 1917. Serial No. 192,773.

Locomotive Noiseless Smoke Consumer. J. H. Lewis, Chicago, Ill., 1,273,885, July 30, 1918. Filed July 25, 1914. Serial No. 853,006.

Fuel Briquet. W. Kennett and E. T. Krebs, Carson City, Nev., 1,273,619, July 23, 1918. Filed Feb. 13, 1918. Serial No. 216,995.

Stoker. W. H. Haas, assignor Murphy Iron Works, Detroit, Mich., 1,273,481, July 23, 1918. Filed Nov. 11, 1914. Serial No. 871,484.

Apparatus for Distillation of Coal. J. L. Grafflin, Astoria, N. Y., 1,274,033, July 30, 1918. Filed Nov. 20, 1917. Serial No. 203,011.

Interlocking Control for Mine Hoists. C. L. Perry, assignor to General Electric Co., Schenectady, N. Y., 1,273,661, July 23, 1918. Filed Mar. 25, 1918. Serial No. 224,618.

Ash Conveyor System. A. Girtanner and R. H. Miller, assignors, to American Steam Conveyor Corporation, Chicago, Ill., 1,273,849, July 30, 1918. Filed Apr. 29, 1915. Serial No. 24,628.

Industrial News

Mobile, Ala.—The National Coal Co. has increased its capital from a nominal $2000 to $20,000.

Hazard, Ky.—The Kentucky Block Coal Co. has increased its capital from $35,000 to $100,000.

Hazard, Ky.—The Lots Creek Coal Co., Hazard, Ky., has increased its capital from $60,000 to $100,000.

Colmar, Ky.—The Long Ridge Coal Co. has filed notice of an increase in its capital from $20,000 to $50,000.

Columbus, Ohio—The Strabley Co. has been incorporated with a capital of $150,000 by John H. Price and others.

Girdler, Ky.—The Steele & Alder Coal Co., capital $18,000, has been incorporated by P. M. Alder, W. B. Steele and Rex E. Steele.

Miami, Okla.—The Eagle Picher Mining Co. is said to be considering plans for the development of coal properties in the vicinity of Miami.

Harlan, Ky.—The Upper Harlan Coal Co. has filed notice of an increase in its capitalization from $60,000 to $100,000 to provide for expansion.

Thurber, Tex.—The Texas & Pacific Coal Co. has filed notice of an increase in its capital from $3,000,000 to $4,000,000 to provide for business extensions.

Pikeville, Ky.—The Fannin Coal Land Co. has been incorporated by J. M. Fannin and associates to operate coal properties in this section, with capital of $50,000.

Hazard, Ky.—The Yerkes Mining Co., capital $1500, has been incorporated by J. E. Baker, W. A. Stanfill and others to enter the coal mining business.

Louisville, Ky.—The Louisville Soap Co., Floyd Street, has had plans prepared for the construction of a series of new coal hoppers at its works to cost about $9000.

Pittsburgh, Penn.—The Pittsburgh & Lake Erie R. R. has commenced excavations for a new coal-handling plant at Brightwood, Penn., to cost about $250,000.

Albany, N. Y.—The New York Central R. R., St. Lawrence Division, is having plans prepared for the construction of a new mechanical coaling plant at Ogdensburg to cost about $30,000.

Muskogee, Okla.—The Baxter Springs Coal Mining Co. has been organized at Muskogee with a capital stock of $20,000. The incorporators are J. T. Sartin, W. O. Manley and C. M. Bowles.

Philadelphia, Penn.—Director of Supplies Joseph S. MacLaughlin has made application to the City Council for an appropriation of from $250,000 to $300,000 for coal for the municipal buildings.

Beattyville, Ky.—The Mekes Branch Coal Co., Beattyville, one of the Kentucky river mining companies, has changed its name to the White Ash Fuel Co., and increased its capital from $25,000 to $50,000.

Charleston, W. Va.—Numerous improvements are being made at the plant of the Barren Creek Coal Co., at Queens Shoals, with a view to increasing the output. This plant is under the management of J. R. Ramage.

Richmond, Va.—The Raven Coal Co. has been incorporated with a capital of $500,000 to operate coal properties. J. E. Hall, Bluefield, W. Va.; Justin J. Stevenson and Willard S. Holcomb, Columbus, Ohio, are the incorporators.

Longstreth, Ohio—The Locke Coal Co. has been chartered with an authorized capital of $30,000 to mine and sell coal. The incorporators are Frank Locke, John Turner, Herbert Locke, Charles Locke and Edwin D. Ricketts.

West Philadelphia, Penn.—The Pennsylvania Railroad Co., 3200 Powelton Ave., Philadelphia, has awarded a contract to Brann & Stuart, Commercial Trust Building, for extensions in its coal wharf No. 2 at West Philadelphia.

Sewelton, W. Va.—The Sewelton Coal Co. has been incorporated with a capital of $150,000 to operate coal properties in the Sewelton section. E. F. and J. W. Graham and W. A. Charlton, all of Hinton, W. Va., are the incorporators.

Roanoke, Va.—The Kentucky Cardinal Coal Corporation has been incorporated with a capital of $250,000 to develop coal lands in the Roanoke field. J. C. Stras, Roanoke, is president; and J. A. McQuail, Hiawatha, Va., is secretary.

Pittsburgh, Penn.—The La Belle Coal Co. has purchased a tract of about 44 acres of coal lands in Harmar Township for a consideration of about $30,000, and is understood to be planning for the early development of the property.

Zanesville, Ohio—The Western Pennsylvania Coal Co. has been incorporated with a capital of $225,000 to mine and sell coal. The incorporators are L. B. Burger, Joel R. Lewis, Samuel H. Sedwitz, David J. Lewis and Joseph Goldberger.

Beech Creek, Ky.—The Kirk Coal Co. which recently filed notice of an increase in its capital from $10,000 to $100,000, is now developing approximately 250 acres of coal properties in the Beech Creek section, having a capacity of 500 tons daily.

Madisonville, Ky.—The Circle City Coal Co. has plans for improvement of its tipple facilities, these plans calling for abolishment of the present incline to the tipple and installation of automatic machinery to lift the mine cars to the tipple for dumping.

Pittsburgh, Penn.—The Pitcairn Gas Coal Co. has recently taken title to about 11 acres of coal properties in Patton township for a consideration of approximately $15,000. It is said that the company is planning for early development operations.

Splash Dam, Va.—The Sutherland Coal Co. has been incorporated with a capital of $50,000 to engage in the development of coal properties in the vicinity of Splash Dam. S. H. Sutherland, Clintwood, Va., is president; and T. L. Sutherland, Lebanon, Va., is secretary.

Heidelberg, Penn.—The M. C. & H. Coal Co., recently organized, is planning for the development and operation of about 50 acres of coal lands in this vicinity. The initial plant to be installed will have a capacity of about 25 tons a day. Patrick Henry is secretary-treasurer.

Charleston, W. Va.—The Booker Washington Development Co. has been incorporated with a capital of $100,000 to operate coal properties in the Charleston district. I. Shuster and John P. Swanson, Danville, Va., and T. B. Bowman, Charleston, are the principal incorporators.

Bradford, Penn.—The Natural Resources Development Corporation has been incorporated in Delaware with capital of $25,000,000 to develop and operate coal, oil and natural gas properties. Carl K. Dresser and James P. Ryan, Bradford; and A. M. Bush, Tulsa, Okla., are the incorporators.

Mount Morris, Penn.—The Mount Morris Coal Co., recently organized, is planning for the development and operation of about 200 acres of coal lands in the vicinity of Morgantown, W. Va. Mining equipment, including electrical machinery, will be installed at the property. M. B. Clovis is president.

Pittsburgh, Penn.—D. Kirk, chief engineer of the Pittsburgh Terminal Railroad and Coal Co., is considering the reconstruction of the tipples at mines Nos. 6 and 7, located about 10 miles from Pittsburgh on the Monongahela River and the old Wabash R. R., now used by the Western Maryland Railroad.

Oklahoma City, Okla.—The Oolagah Coal Co. of Enid, Okla., has been organized and charter filed in the office of Secretary of State Lyon at Oklahoma City. The company is capitalized at $300,000 and the incorporators are Robert D. Anderson, O. A. Triplett, both of Enid, and Henry Flanders, of Weimer, Okla.

Charleston, W. Va.—Anchor Coal Mining Co., Morgantown, W. Va. Capital stock, $100,000. To operate mines in Monongalia County and elsewhere in West Virginia. Incorporators, John C. Pollock, of Fairmont; Wilford B. Grim and E. A. Allen, of Shinnston; Ernest H. Gilbert and Mable Wilson, of Morgantown.

Louisville, Ky.—The Pittsburgh Coal Co., which in past years handled river coal from barges almost exclusively, is now handling considerable quantities of rail coal, including western Kentucky. At the present time the company is endeavoring to locate a new or second-hand locomotive crane to aid in unloading and handling coal in the yards.

Joplin, Mo.—The Lightning Creek Coal Co., will start work Oct. 1 on the development of its coal mine near Pittsburg, Kan. About $25,000 is to be expended. Material and equipment needed and not yet purchased include coal cars, concrete, boilers, hoist, lumber, roofing, steam engine, wire cable, etc. P. E. Tabor is superintendent in charge.

Charleston, S. C.—In connection with extensive improvements to practically double the present capacity of its plant, the Charleston Consolidated Railway and Lighting Co. is planning for the installation of new coal and ash-handling equipment at the Charlotte St. generating station. The entire expansion program is estimated to cost about $700,000.

Baxter Springs, Kan.—Work will be started Oct. 1 by the C. and M. Mining Co. on the development of its coal property near here. The estimated cost of the proposed plant is put at $25,000. Equipment and material not yet purchased include a steam shovel, engine, boilers, concrete, screens, belt, tracks and cars. G. R. Cook is the superintendent at the works.

Beaumont, Tex.—The Texas Steel Co. has acquired a tract of coal property near Birmingham, Ala., and plans to develop the lands for a production of over 150,000 tons a month. The site is located in the Warrior River district, and in connection with the proposed coal plant a coke works is contemplated, to be used for the company's steel works at Rusk, Texas.

Clarksburg, W. Va.—Clarksburg will be the headquarters of the Clarksburg Domestic Fuel Co., which will develop coal lands in Harrison County, the company having been granted a charter by the secretary of state. The incorporators are Thomas J. Francis, J. H. Stephenson, Robert Shuttleworth, Edward W. Laubenstein and Louis E. Dorsey, all of Clarksburg.

Oakland, Md.—The Freeport Coal Co. is planning for the development of about 300 acres of coal lands near Corinth, W. Va., and proposes to provide a plant with an initial capacity of about 100 tons a day. A housing settlement for employees at the mines will also be established. The company has recently increased its capital from $25,000 to $100,000. R. T. Thayer is superintendent.

St. Louis, Mo.—An inventory of the estate of Charles E. Gartside, former president of the Gartside Coal Co., filed in the Probate Court, shows that he left a personal estate of $217,002.25, on which $210,500 was in bonds. One-half of the estate was bequeathed to his wife and the other half to a niece and three nephews, one of whom is Robert A. Niggeman, president of the Gartside company.

Springfield, Ill.—The skip-stop system installed by the Springfield Consolidated Railway Co. will save 10 per cent. of the coal normally consumed. Twenty-five per cent. more will be saved by the elimination of part of the heating and lighting of the cars. The normal consumption by the Springfield Consolidated Railway Co. and the Springfield Gas and Electric Co. is 100,000 tons annually.

Columbus, Ohio—The Arrowhead Coal Co., recently chartered with a preliminary capital of $1000, which will soon be increased one hundred fold, has acquired a tract of 1000 acres of coal lands in Perry County, on the Pennsylvania, which will be developed by stripping. Machinery has been ordered and it is expected that coal will be loaded in 60 days. The overburden is about 20 ft. on the average.

Charleston, W. Va.—Former Judge H. D. Rummel, of the Common Pleas Court of Kanawha County, heads the newly organized Central Byproducts Coal Co., which will establish a plant in Big Sandy District of Kanawha County, representing an expenditure of about $60,000. The incorporators, in addition to Judge Rummel, are H. S. Rummel, H. T. Smarr, D. O. Blagg and J. C. Morris, all of Charleston.

Bellaire, Ohio—The shaft mine of the Captina Coal Co., which is located at Armstrong, has been taken over by A. A. Minder, Robert Matnice, James F. DuBois and Charles Wise, all of Bellaire. The new owners, who intend to secure a charter, will soon start development work looking to an increase in output. The mine will be electrified and new equipment and material will be purchased. William Rennie is superintendent in charge of operation.

Pittsburgh, Penn.—A deal is pending between the General Edison Company of New York, and D. B. Zimmerman of Somerset, Penn., president and chief owner of the Quemahoning Coal Co., operating several mines in Somerset County, for the purchase of the latter company and the Indian Creek Railroad, connecting with the Baltimore & Ohio R.R., and serving some of the mines. The remaining mines are on the Baltimore & Ohio Railroad.

Morgantown, W. Va.—Taylor County people are behind a new coal venture in Monongalia County and plan to operate mines in that county near Opekiska, the company to be known as the Somerville Coal Co., whose chief office will be established at Grafton. The company has an authorized capital of $30,000, the incorporators being Eugene Somerville, Laura E. Somerville, Mary M. Somerville, Mary S. Holden and Rufus Holden, all of Grafton.

New York, N. Y.—The United States Steel Corporation is said to have acquired a tract of about 12,000 acres of coal property located on the Monongahela River in the northern section of Greene County for a consideration understood to be in excess of $4,000,000. It is said that the company will soon commence operations for the development of the properties, which will produce coking coal exclusively, and will be used in the various furnaces of the company.

Oklahoma City, Okla.—City officials of Oklahoma City have decided to establish a municipal coal yard. Contracts for a coal supply will immediately be made. This will not interfere with local coal yards, but coal will be sold from the municipal yard when other coal yards are out, and the poorer classes will be served first. According to Allen Street, county fuel administrator, not more than one in twenty families in Oklahoma City have provided a coal supply for the winter.

Charleston, W. Va.—Further development of coal lands near Hartland, in Clay County, will be undertaken in the near future by the Clay County Fuel Co., which has a capital of $100,000, Charleston and Philippi business men being chiefly interested in the new venture. The principal figures in the new company are S. A. Moore, of Charleston; A. J. Peck, of Charleston; William Taylor George, of Philippi; H. J. Wilcox, of Philippi; A. A. Lilly, former Attorney General, of Charleston.

Chicago, Ill.—The general offices of the Wood Equipment Co., manufacturers of the Pneumatic rotary dump, have been moved from the McCormick Building to 1220 East 75th St., Chicago. The company has acquired a large tract of land fronting on the Illinois Central R. R., together with a number of buildings, including a workshop. The growing demand for the company's product will necessitate the enlargement of the factory facilities, and new construction will be undertaken as soon as conditions permit.

Newark, N. J.—The Burnrite Briquet Co., of Newark, N. J., has filed plans for its proposed new manufacturing plant at Avenue A, Alpine and Earl Streets, to cost $95,000. The initial works will consist of five one, two and four-story buildings for general manufacturing, as follows: One, two and four story main structure, 66½ x 88 ft.; one-story, 52 x 54 ft.; one-story, 42 x 42 ft.; two-story, 24 x 40 ft.; and one-story, 31 x 164 ft. A steel coal conveyor trestle, 280 ft. long, to cost about $7000 will also be constructed.

Indianapolis, Ind.—Plans for the formation of a protective organization by Indianapolis coal dealers to stop the theft of coal from cars in the railroad yards have been discussed and further meetings will be held. It is estimated that the thefts amounts to $100,000 annually. One dealer reported that his company had lost $7500 in one month through wholesale thefts from cars. Martin Rehfuss, Jr., fuel administrator for Marion County, said that he would coöperate with the coal dealers in their efforts to stop this loss.

Charleston, W. Va.—The Kanawha Collieries Co., Charleston National Bank Building, recently organized, is planning for the immediate development of a tract of coal property of over 1000 acres of a total site of about 2700 acres of land held in the Swiss section of the state. The company will install a complete mining plant for development and operation, consisting of tipple machinery, conveying equipment, mine railway line with cars and other machinery. All equipment will be electrically operated wherever possible, with substation provided for this purpose. William G. Conley is president.

Toledo, Ohio—Dock activity during the week ending Sept. 21 was generally satisfactory, although the tonnage loaded was not as large as during the previous week. Special efforts are now being made to get a large tonnage to the Northwest before the close of navigation. During the week the Toledo & Ohio Central docks handled 73,000 tons as compared with 92,000 tons the previous week, making a total of 1,522,000 tons for the season. The Hocking Valley docks during the same week handled 190,333 tons as compared with 207,000 tons the previous week, making 3,487,000 tons for the season.

Cincinnati, Ohio—The Lunkenheimer Co., manufacturers of high grade engineering specialties, royally entertained the delegates and visitors of the N. A. S. E. National Convention held here during the week of Sept. 9. The company obtained permission to use Cincinnati's wonderful Zoological Gardens, and judging from the large attendance every one visiting the convention was present. It was the consensus of opinion of the delegates and their friends that the Lunkenheimer outing made the 1918 convention one of the most enjoyable and interesting ever given and one long to be remembered.

New York, N. Y.—C. A. Graves has been appointed Administrative Engineer for New York State by Delos W. Cooke, State Fuel Administrator. Mr. Graves was formerly Assistant Administrative Engineer in charge of the New York-Metropolitan District. He is president of the Graves Engineering Company and vice president of the Southern New York Power & Railway Corporation. Previous to his forming the Graves Engineering Co. five years ago, Mr. Graves was power engineer for the Edison Electric Illuminating Co. of Brooklyn, and previous to his work in Brooklyn he was superintendent of power for the Peckham Manufacturing Co., manufacturers of electric railway equipment.

Pittsburgh, Penn.—The Pennsylvania Coal and Coke Corporation, of Cresson, Penn., has commenced the foundation for a new tipple at its Patton mine, to replace the tipple entirely destroyed by fire July 18. Mines Nos. 33 and 37 are located near Patton. Picking belts will be installed for the hand removal of impurities intermixed with the lump size of coal, and and experimental coal-washing jig with the necessary coal-handling equipment will be provided for the removal of impurities intermixed with the nut and slack sizes of coal. During construction of the surface plant coal mined at No. 33 mine will be delivered over Mine No. 37 tipple by underground connection. The entire construction is in charge of H. H. Hasler, mining engineer for the Pennsylvania Coal and Coke Corporation.

Seattle, Wash.—Due to heavy demand for steaming coal for the new government ships and the regular offshore vessels, no immediate relief is in sight for the fuel shortage that is hampering a number of the steamship lines operating out of this port. Curtailment of service may become necessary unless the steamboats change to wood fuel. Increasing output of new Government ships in this district has added immensely to the demand for steaming coal, and the labor shortage in western Washington mines has prevented the mines from meeting this. The movement of 100,000 tons of Northwest coal to Chile. it has been explained by operators, has no effect on the sea situation, as the coal for that country is railroad fuel and is not adapted for ship use.

St. Louis, Mo.—Application of the Laclede Gas Co. to the Missouri Public Service Commission for permission to increase its rates for gas has disclosed that the company is losing $789,000 a year because it is under long-time contracts which cause it to sell its byproducts at less than the market price. The company buys and sells its coke under a reciprocal contract with the Consolidation Coal Co. which does not expire until Dec. 31, 1919. Under that contract the company pays a maximum price of $3.65 a ton for its coal. It receives $4 a ton for gas-oven coke and approximately $5 a ton for its metallurgical coke. Although it gets its Elkhorn coal at $3.65 a ton, while the Government price is $5.15, delivered in St. Louis, its advantage in that respect is heavily overbalanced by the fact that, if it were not for the contract, it would be getting $7.75 for gas-oven coke and $9.90 for metallurgical coke.

Pittsburgh, Penn.—H. H. Hasler, mining engineer, Pennsylvania Coal and Coke Corporation, Cresson, Cambria County, Pennsylvania, is making a study of the coal seams at mines Nos. 33 and 37 near Patton, mine No. 46 near Winburne, mine No. 8 near Ehrenfeld and mine No. 15 near Beaverdale. The owners have in view the marketing of only well cleaned and sized coal and contemplate removing the impurities loaded in the cars by the miners by hand-picking the larger sizes and washing the nut and slack sizes. They are also seriously considering mechanical appliances for reclaiming the coal values in the extensive refuse pile adjoining mine No. 33. This pile consists of slate, pyrites, bony rock and coal. Preliminary tests show that 25 per cent. of the pile is very fair coal containing on an average 11½ per cent. ash, less than 1 per cent. sulphur, 25 per cent. volatile matter and 63.50 per cent. carbon.

MARKET DEPARTMENT

Weekly Review

Bituminous Mines Slow To React to Stimulation—Soft Coal Output Shows Decline in Spite of Efforts Made To Boost Output—Improvement in Car Supply Discloses Shortage in Man Power—Anthracite Production Falls Off Because of Strike

THE bituminous miner, as a class, does not seem to react noticeably to the many attempts being made to speed him up. In spite of the earnest work of production committees to boost output, in spite of get-together meetings held for the express purpose of acquainting the miner with the importance of his labor to the war program, in spite of an improved car supply and the existence of other favorable conditions, the output of soft coal keeps going down from week to week. During the week ended Sept. 21, the bituminous mines shipped 12,650,000 net tons of coal. This quantity is by no means near the maximum capacity of the mines, though it exceeds by 2,060,000 net tons the output of the corresponding week of 1917. To successfully meet the urgent demands imposed by our war industries the bituminous mines should be working to the straining point, and it is toward this end that the production department of the Fuel Administration is laboring.

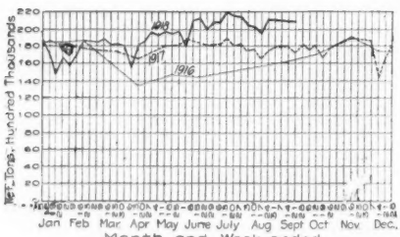
As the car supply at the mines continues to improve the shortage in man power makes itself more evident. Labor at the mines is uneasy, and if too hard pressed the worker packs his belongings and goes elsewhere, lured on by the higher rates of wages paid in other industries. It never before was so difficult to maintain a spirit of contentment in the mine worker, and this is undoubtedly responsible for the poor showing made by some operations.

The recent strike in the anthracite region caused a drop in production for the week ended Sept. 21, as the total output for that period amounted to only 1,847,000 net tons, a decrease of 241,000 net tons as compared with the week preceding and 159,000 net tons lower than the production during the corresponding week of 1917.

So far as market conditions are concerned, the demand still continues greater than the supply, with a scarcity existing in the domestic sizes of anthracite. The smaller sizes of steam coals are plentiful in the larger cities of the Atlantic seaboard, and some of the producers, it is claimed, are even shading prices in order to dispose of their stocks.

WEEKLY COAL PRODUCTION

Bituminous coal production during the week ended Sept. 21 varied but little from the week preceding and is estimated at 12,650,000 net tons. This output, while 0.4 per cent. below the production during the week of Sept. 14, exceeded production during the corresponding week of 1917 by 2,060,000 net tons, or 19.4 per cent. It will be noted that while the decrease in production during the week ended Sept. 21 was slight, compared with the week preceding, the decrease during the corresponding week of 1917 compared with the week of Sept. 14, 1917, amounted to 387,000 net tons, or 3.6 per cent. thus interrupting for the



second successive week the parallelism of the curve of daily production this year and last maintained during the past three months. The daily average during the current week is estimated at 2,108,000 net tons, slightly lower than the week preceding, but considerably in excess of the daily average (1,765,000 net tons) during the week of Sept. 21, 1917.

The strike in the anthracite fields during the week ended Sept. 21 caused production to decrease 11.3 per cent. The output is estimated at 1,847,000 net tons as compared with 2,088,000 net tons during the week preceding, and as against 2,006,000 net tons during the corresponding week of 1917. The daily average during the current week is estimated at 308,000 net tons, considerably less than the daily average for the coal year to date of 337,000 net tons, which is 2.1 per cent. in excess of the daily average of the same period of last year.

Carriers' reports show increased shipments of bituminous coal during the week ended Sept. 21 from the district including northeast Kentucky, high volatile of southern West Virginia and smokeless fields of West Virginia, Alabama, the district including Illinois, Indiana and Western Kentucky, and the district including Cumberland, Piedmont and Somerset and Fairmont.

Bituminous coal dumped at lake ports, during the week ended Sept. 21, amounted to 1,143,568 net tons, a slight decrease compared with the week preceding. However, compared with the weekly average during July, August and September, the current week's tonnage was 80,000 net tons, or approximately 8 per cent. in excess.

The falling off in shipments to New England during the current week was even greater than the decrease in tidewater shipments, reports from all harbors showing approximately 15 per cent. less coal moving to New England than during the week preceding. Rail receipts also declined 8 per cent., making a total decrease in New England coal, for the current week compared with the week preceding of 12.6 per cent. The decrease in shipments from New York and Philadelphia amounted to 5.7 per cent., from Baltimore 21.1 per cent. and from Hampton Roads 18.4 per cent. Compared with the weekly average for the coal year to date, New England coal receipts, during the current week, fell approximately 36,000 net tons or 6 per cent. Both rail and tidewater figures show a falling off compared with the weekly average, while analysis of tidewater shipments show that New York, Philadelphia and Baltimore exceeded the weekly average, but Hampton Roads fell behind 19,000 net tons or 10 per cent.

Beehive Coke—Beehive coke production in the United States during the week ended Sept. 21 is estimated at 614,000 net tons, 21,000 net tons, or 3.5 per cent. less than production during the week preceding. The daily average during the current year is estimated at 102,000 net tons as against 106,000 net tons during the week of Sept. 14. Operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke during the week of Sept. 21 at 386,640 net tons, and operation of their plants at 76.7 per cent. of their full time, as against 77.8 per cent. during the week preceding. Slightly greater yard labor shortage existed during the current week and as in preceding weeks was the limiting factor.

Byproduct Coke—Operating conditions in the byproduct industry changed but little during the week ended Sept. 21. The plants of the country were operated at 89.2 per cent. of their present capacity, as against 89.4 per cent. during the week preceding. A slightly better coal and labor supply existed during the week, while repairs to plants limited production slightly more than during the week preceding. Material improvement occurred during the week in Indiana, Pennsylvania, Tennessee and West Virginia. In Indiana better supply of coal brought about the improvement, in Pennsylvania better labor conditions, in Tennessee repaired plants and in West Virginia other causes. A falling off in production occurred in Alabama, Maryland and Minnesota, and is attributed by the operators in the former state to repairs to plants and in the latter two states to other causes. Increased capacity of Pennsylvania plants is due to starting up more ovens at the Carnegie Steel Co., at Clairton, Penn.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended Aug. 31	Sept. 7	Sept. 14	Sept. 21
Bituminous shipments, 123 roads	223,966	195,367	223,131*	222,874†
Anthracite shipments, 9 roads.	41,281	32,234	40,699	36,859

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Dry Goods Economist—Cotton and cotton goods prices continue to hold the attention of the trade. What constitutes a "fair" price for raw cotton now has not yet been disclosed, if, indeed, it has been determined by the committee appointed last week by President Wilson. There has been no change in the wool situation.

Marshall Field & Co.—Current wholesale distribution of dry goods is running well ahead of the heavy shipments for the same period a year ago. The total volume of road sales for immediate and spring delivery is in excess of the same week in 1917. Customers in the market numbered about the same. Collections continue good.

American Wool and Cotton Reporter—A feature not to be overlooked in the wool market is that pressure is being brought to bear in regard to Australian wool. The supply is becoming large and unwieldy, and probably as the shipping situation improves more of such wool will become available to English or American manufacturers. In the minds of the cotton trade the question of price-fixing is naturally uppermost. Prices will be fixed only for the present crop, it is understood, and not for that of another season.

Bradstreet's—Government work expands at the expense of non-essential enterprise, and as goods for ordinary trading tend to become scarcer, buyers in the prosperous crop-yielding zones are anxious to get down orders. In the big eastern centers, however, where taxes, subscriptions to the Liberty bonds, high wages for labor, and the prospective withdrawal of large numbers for militant efforts are factors, buying is conservative. Nothwithstanding all reservations, the flow of business is considerably stronger than the ebb, war work, of course, predominating. Non-essential lines reflect further curtailment, and while buying of holiday gifts has started, the tendency is to eschew luxuries, though here and there new-found wealth has brought about some squandering.

The Iron Age—Price fixing for the fourth quarter, as announced from Washington Tuesday, brought some surprises. Lake Superior iron ore producers asked for 50c. more and were granted 25c., on the ground that the 45c. advance given them three months ago was all absorbed in higher rail freights. Eastern iron ore producers had expectations of sharing in the ore advance, but this was denied them and all other ore producers outside the Lake districts. All basic and foundry iron furnaces get the benefit of a $1 advance. For Tennessee furnaces the advance ranges from $1.25 to $1.75. Virginia furnaces and those in eastern Pennsylvania fare considerably better because of greater distance from the basing points. The general committee of the Iron and Steel Institute has promptly put out new price tables based on the President's proclamation as to pig iron. Differentials on foundry and higher silicon irons are raised; cast iron pipe is put up $5; cut nails and horse shoes are advanced, and various other revisions upward are made.

Atlantic Seaboard

BOSTON

Receipts of bituminous by rail show steady decline. Recent Washington rulings more liberal as to permissible reserves for Class I plants and are being liberally construed. Slackening receipts by water are also the rule. Largely increased requirements for oversea purposes, including naval needs, one of outstanding features. Already there is real anxiety over the advancing season and curtailed shipments. Slow dispatch at Hampton Roads may necessitate releasing additional ships for ocean service. This one of pressing problems. Anthracite shipments sag off. "Storrow anthracite" now coming forward. Difficulties over "allotments" still arise.

Bituminous—From Central Pennsylvania in particular can be noticed a gradual but none the less steady decline in shipments for New England, both all-rail and via the New York piers. Figures for the first three weeks in September show that the reduction all-rail from this one district amounted to more than 25 per cent. Wholesale embargoes placed through recommendation of the different state administrators had a material bearing on this diminished movement, but there has also been evident a large increase in shipments for government use. In addition there has been the case of byproduct plants demanding much heavier deliveries because of new ovens in operation. As an instance of this, two large power plants in Massachusetts chiefly dependent upon coal that has now been requisitioned for byproduct purposes are now relying upon emergency orders to build up a reasonable supply.

The situation as to permissible reserve limits is now much clarified. The Washington ruling of Sept. 13 allows Class I plants to accumulate 105 days supply, and this is so much nearer a reasonable stock limit that consumers on the whole feel much easier. The local fuel authorities are also trying to deal with this subject in a broad-minded way.

Meanwhile, receipts by water have also sloped off to quite an extent. The movement of a considerable volume of coal westward and to line byproduct plants, together with government requirements at the piers, has very much curtailed the flow to Hampton Roads. Detention there only increases, and it is nothing unusual for a steamer to wait five days or even longer for a cargo. The railroads here have had better success lately in accumulating reserves and are fully alive to the wisdom of taking on coal whenever it is available. There is, in fact, a moderate spot demand from the railroads and other large buyers and now that the discharging berths are in better shape, there is no undue delay in handling coal promptly on arrival.

Those who are best informed admit a growing concern for the winter outlook. Without question receipts in New England both by rail and water are going to be cut in drastic fashion. There are rumors of requirements across the Atlantic that exceed any estimates given out, and since those demands will have to be met largely from Hampton Roads, whence comes the largest tonnage for this territory, the subject is one of some interest. Mr. Garfield is on record himself as saying that recent estimates early in the year show that for bunkering purposes alone the increase is 100 per cent. beyond that of last year. We have not yet begun to comprehend the amount of coal that will have to move across the Atlantic between now and spring. More and more ships are coming off the ways and each one adds to the fuel consumed.

A large number of buyers, especially smaller consumers, are still inclined to be fussy about quality and about bunching of cars and the cancellations of requisitions previously on file for administration coal are many and frequent. When shipments have come forward as easily as they have the past two months there is always a sense of security which leads consigners to postpone receiving coal which later they are sure to want.

Out of the movement of wagon coal from Central Pennsylvania there have been some interesting developments. The volume of this coal for New England is much reduced, the high point having been reached when during August about 700 cars were shipped each week to New England consigners. The movement has now dropped to about 350 cars weekly. At the time when the number of box cars was greatest there were many cases of congestion in New England, wagon coal having reached destination at the same time coal was pouring in through regular trade channels, both all-rail and by water. Several serious cases of demurrage resulted and on that point the Railroad Administration has come to the relief of the ultimate consigners by stating that on suitable certification by the fuel authorities a refund will be allowed in case of reforwarded coal, the demurrage to count only from the time delivery is accepted by the party for whose account the car is unloaded.

Anthracite—A further falling-off in shipments of domestic sizes is still noticeable. The "independents" are making no better shipments and the companies are struggling to meet their obligations as pointed out by the anthracite committee. Among the later requisitions is one for 50 cars daily of domestic sizes consigned to Mr. Storrow at the New England gateways. The program is for each retail dealer applying for a share of this coal to send his check in advance to the New England Fuel Administration and bind to accept whatever size is sent him regardless of his preference. In other words, it is considered "anthracite," no distinction being made as to size or grade. It will be interesting to watch the progress of this experiment. The coal has already begun to start forward.

There continue to be difficulties over the "allotments" granted to various communities. Many of these arbitrary estimates are futile because so little heed has been given to local distribution and other conditions understood clearly only by the retail dealers themselves. In consequence towns that are simply unloading ports have been "absolutely embargoed," more attention having been given the size of population than the actual number of tons unloaded during the basic year. Too much in the way of regulation has been attempted and unless some of the bars are taken down there will be a lot of suffering result from the use of a too finely graduated measuring stick.

NEW YORK

Anthracite moving slowly and local dumpings fall behind. Further steps taken to conserve fuel and "lightless night" order to be enforced. Buckwheat sizes plentiful. Shipments to non-essentials result in larger supplies of bituminous. Bunker situation satisfactory.

Anthracite—The situation is moving slowly but surely. Dealers are far from satisfied with the tonnage available, but they are not complaining because they know that consumers are better supplied than they have been under normal conditions in previous years. However, there is a steady demand for the domestic sizes and there is small prospect that this winter will see any surplus on hand. With the month to go three days, dumpings at the local docks for the first 27 days of September were 25,704 cars, as compared with 27,666 cars for the corresponding period of August, a decrease of 1962 cars. This is not encouraging to the trade when it is realized that the early fall months are here.

Part of this decrease is accounted for in the suspension of work by upward of 30,000 mine employees for a few days last month. For the week ending Sept. 27 the dumpings were 6727 cars, a decrease of 69 cars from the previous week, a loss which was principally felt by the local trade inasmuch as New England is receiving most of its coal by rail. On the other hand, production for the week ending Sept. 14 is estimated at 2,088,000 tons, an increase of 29.1 per cent. over the preceding week. Shipments for the week were 40,699 cars, an increase of 8465 cars over the preceding week, but a loss over the shipments of the two previous weeks. The trade is interested in the reports showing increased production and shipments, but are wondering where the coal is being sent.

Shipments of domestic sizes, including pea coal, have been ordered discontinued to 321 communities in this state by the Anthracite Committee, producers and distributors being ordered to concentrate their shipments to other points in the state. This may result in more coal being sent to this market.

With a scarcity of the domestic sizes the reverse exists with respect to buckwheat and smaller coals. There is plenty and more of the smaller coals to go around and some producers have had men out looking for buyers. This is said to be particularly true of independent operators, some of whom, it is also claimed, have been shading prices. In some instances retail dealers, it is claimed, are being asked to take a proportionate share of buckwheat, rice or barley with their orders for the domestic sizes, in order to reduce the stocks of the small coals.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck...$5.10	$5.90
Egg.... 6.65	7.40	Rice.... 4.65	5.10
Stove... 6.90	7.65	Barley.. 4.15	4.30
Chestnut 7.00	7.75	Boiler.. 4.60	
Pea..... 5.50	6.25		

Bituminous—The stopping of deliveries to non-essential industries has put the situation on a better basis so far as supplies of commercial coal goes. There is more coal available for consumers on the preference list, and some shippers were reported to have so much on hand that they are soliciting business. However, when efforts were made to run down these reports they could not be verified. On the other hand, there were shippers who were anxious to locate some available coal. In some circles it was said that producers of gas coal which had been loaded in box cars had disposed of it to outside parties.

The report of dumpings in this harbor fails to show more coal coming here. For the week ending Sept. 27 there were but 7059 cars dumped as against 7277 cars the previous week, a decrease of 218 cars. For the first 27 days of September there were 27,617 cars dumped as compared with 26,908 cars for the first 27 days of August, an increase of 709 cars. For September the average daily dumpings were slightly below the average for the previous two months.

From the mining regions come reports of heavier production and shipments, 36,884 cars having been shipped from the central Pennsylvania fields during the week ending Sept. 14, over the shipments of the previous week, which included Labor Day.

To further save fuel plans are under consideration by State Fuel Administrator Cooke and his associates for consolidating the small electric plants and replacing the less economical isolated plants with central station service. Mercer P. Moseley, chief of conservation for this state, points out that a 100-hp. plant burns 9 lb. of bituminous coal per kilowatt-hour, an average 10,000-hp. plant burns 3 to 4 lb. per kilowatt-hour, and a first class 50,000-hp. plant burns only 2 lb. per kilowatt-hour. He also says that coöperation among electric power companies will save large quantities of coal and increase the profits of operation.

The railroads continue to absorb fuel in good volume. There is a strong call for supplies from points along Long Island Sound, and a decided effort is to be made to take care of the situation before real winter sets in and before transportation difficulties arise. The bunker situation remains practically unchanged. There are plenty of vessels here to take up all the coal available for bunkering purposes but there is no delay in loading.

State Fuel Administrator Cooke has issued an order permitting wholesalers to

add to the purchase price of any coal shipped by water and delivered alongside consumer's docks in New York State, a charge not to exceed 28c. per net ton. This charge shall include insurance, and may be added to the mine price of the coal, plus freight rate to tidewater plus war taxes on freight, plus demurrage at loading points, plus actual boat charges. The order does not apply to coal delivered to retail dealers. The wholesale margin shall include any purchasing agent's commission, or selling agent's commission heretofore authorized by the United States Fuel Administrator, and shall not be in addition thereto. The combined charges or commission of any number of wholesalers or jobbers of a given shipment or shipments of such coal shall not exceed the maximum charge herein allowed for one wholesaler.

Mr. Cooke's order amends an order issued by Ellery B. Gordon, Assistant to the State Fuel Administrator, on June 27, in which he authorized a margin not to exceed 35c. per net ton on coal physically handled by jobbers within the harbor limits of New York State.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack.....	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine.....	3.08	5.23
Prepared.....	3.36	5.51
Slack.....	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite receipts of wanted sizes short. Some accumulation of egg and pea again. Rumors of heavy shipments on the way. Unfavorable labor conditions. Production slightly off. Decision on wages expected daily. Dealers trying to satisfy all customers. Cool weather starts fires. Coal in good preparation. Credit conditions ideal. Steam coal slightly eased. Bituminous in fair volume. Car supply 60 per cent. Current demands cared for.

Anthracite.—Small receipts continue to annoy the retailers, at least the wanted sizes. The consuming public has hardly lost any of its peculiarities as regards the size of coal it wants. It is true that the threatened strike and partial tie-up did induce many of them to take any size that the dealer had in stock. Now that the mining trouble seems to have been temporarily averted the same insistence on stove and chestnut has again cropped up. In the meantime egg and pea are once more accumulating in the yards. The demand for pea coal has been better the last few days, as with the coming of cool weather the humbler class of patrons is calling for it, and in other instances customers who are waiting for stove and nut have been willing to take a ton or so of the small coal to help out.

The labor situation is even more burdensome than ever. Men are scarce and wages high. As a result there is much private bidding for labor, and the changes from one yard to another are a common occurrence. The operators are also reporting that they are growing shorter of help from day to day, despite all restraints which have been placed against the men leaving the mines.

No decision has been rendered as yet by the local fuel administration on the increased margin asked for by some of the retailers, and there is no likelihood that there will be so long as the wage question in the anthracite region is pending. The dealers claim that they are "up against it," as their expenses are slowly creeping up from week to week.

The order from the fuel authorities directing that no further deliveries be made on filling orders which have received two-thirds of their allotment, until Jan. 1, was hardly necessary at all. The retailers are practically a unit in regretting that they followed the committee's suggestion in the spring to fill orders on the two-thirds basis, which was at their option to choose as they thought best. Most of them started in to try to cover all of their orders in this manner and they now find themselves with hundreds of orders on their books without a single pound delivered. Now, with coal burning weather here, they are being sorely pressed to keep these customers satisfied with a ton or two.

With the coming of cool weather the office of the fuel administration was deluged with requests to start furnace fires. These inquiries came from office buildings and schools. In fact so numerous were these requests that the committee was much gratified to learn in this manner the dependence that the people had placed in them. The committee disclaimed direct authority in the matter, but left it up to the individual to decide whether it was necessary to have heat or not. They were warned, however, that they must be careful not to heat buildings at a temperature in excess of 68 deg. The authorities have made it known that they are going to insist on this regulation and in the larger buildings expect to install recording thermometers under seal and will punish any flagrant violations. In the suburban sections the various local fuel committees had ruled that the public heating plants should not turn steam into their mains before Oct. 15, but this week they modified their ruling to the extent of allowing steam to go out but under a reduced pressure.

Inquiry was made lately of the dealers as to the condition of coal reaching their yards; that is, as it related to preparation. In most instances the report was that there was rarely any room for complaint. Of course, there is a considerable tonnage of washery coal coming on the market, and often the dull appearance of much of this product is the cause of complaint from some customers. Even this coal will cause no question if enough fresh-mined coal was received to mix with it. However, the dealers have learned that most of the washery coal is of good quality and have no particular trouble in having their customers accept it. So far as the shipping companies are concerned they practically receive no complaints whatever.

Credit conditions continue ideal and there is really no such a thing as an outstanding account. Many dealers come in the offices and offer spot cash if they can only procure prompt shipment, but of course such tenders are of no avail. The only people who do pay cash in advance these days are the dealers who on searching their records find they have bought a car or so from some shipper in 1916 and no permanent relations having been established, this generally resolves itself into a cash transaction.

Probably there is some slackening of the pressure for steam coals following the easing off of the strike conditions at the mines. At any rate the small domestic demand for buckwheat which sprang up at that time has about vanished, with the exception of those far-sighted dealers who continue to put away a good tonnage of this coal when they can get it. Rice coal is moving fairly well, although small tonnages can occasionally be procured by new customers, most of this going to concerns who, having abandoned the use of culm as a mixture, are having a measure of success with rice. The market for culm can be said to be almost flat, as it appears that every consumer who had the least idea of being able to use it has now given it a trial. No particularly active business is expected in this grade until later in the season.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken.....	$4.90	$6.25	Buckwheat..	$3.40	$4.45
Egg.....	4.80	6.15	Rice.....	2.90	3.80
Stove.....	5.05	6.40	Boiler.....	2.70	3.70
Nut.....	5.15	6.50	Barley.....	2.40	3.30
Pea.....	3.75	5.00	Culm.....	1.25	2.15

Bituminous—Labor and car supply continue to dominate the bituminous trade. Of cars there appears to be an average of a 60 per cent. supply during the last ten days, while labor at no operation is nearly adequate. This condition would show itself more seriously if the car supply should approach 80 per cent. to 90 per cent. Fairly good receipts of coal are reaching the city both from the Pennsylvania and West Virginia zones, although the heavier users are not able to add to their stocks in the volume they did during the summer. It can be said that the industries here are fairly well taken care of for current needs, and most of the anxiety on their part is due to wondering what the future supply will be. It is understood that the wagon mines are being fairly supplied with cars and some brokers in this coal have recently have had fair tonnage for their trade.

BALTIMORE

Demand for cleaner coal spreads, and rejections of box cars are becoming more frequent as supply becomes a little easier. Operators called to discuss condition. Anthracite men in quandary as to short supply and methods of delivery under restricted profit margin.

Bituminous—Supplies of bituminous here continue to get easier as a steady run of fuel keeps up, and a number of big war plants that have supplies a long way ahead are kept out of the market. The heavy proportion of box-car shipments continues, however, and there is a growing tendency on the part of some consumers to refuse to receive the coal in this manner. The box-car coal as a whole not only is less desirable than the coal shipped in open-top cars, but it costs more initially and for unloading. The reduction of heating efficiency by reason of bad coal has spread so seriously from the ordinary business consumers to the preferential fuel supply classes, including railroads, shipyards and steel plants, that the fuel administration has called a meeting for October 3 in Cumberland, Md., of 500 operators of the Somerset, Cumberland, Piedmont and Upper Potomac districts to devise some method of correcting the evil.

There is talk in the trade over the statement that the Government is planning to district coal mines in certain sections and require a minimum production, even if miners have to be shifted from mine to mine to accomplish the result. One of the difficulties of ordinary business is the constantly growing call here of the Government for the best class of coal. Thus the navy has just established a supplemental pool at tidewater to be known as No. 73. Lack of pier labor has presented another problem. First it closed Port Covington and Locust Point piers, leaving Curtis Bay running for coastwise and Government coal, and Canton running for Government coal, as well as harbor and bay points delivery. So much delay was had in loading floats, barges and schooners for ordinary business that it was determined to reopen Port Covington for that purpose. After ten days the order was rescinded and Canton was instructed to get out the business as best it could by working all night shifts.

Anthracite—The situation here is so tight for hard coal that both the dealers and fuel administration officials are fearful that cold weather will find many homes without coal. The local fuel committee has ordered dealers to deliver only one- or two-ton lots. Dealers claim that after supplying part of their trade with two-thirds and having more than 200,000 tons of undelivered orders on their books, much of it since spring, such a plan is not equitable.

Lake Markets

PITTSBURGH

Lake shipments to close of navigation. Byproduct coal scarce. Car supplies fairly satisfactory.

The Pittsburgh district is now regularly shipping in the lake trade from 300,000 to 350,000 tons of coal a week. This is more than its original quota, but on account of meager shipments from some other districts the lake trade not only cannot be taken care of by Oct. 15, the date originally fixed, but can hardly be taken care of up to the close of navigation. R. W. Gardiner, production manager for the district, states that he expects to be required to continue lake shipments as long as the boats can run. Essential industries are being taken care of, as to their current consumption, but are not allowed to stock any coal. Byproduct coal supply is not satisfactory, but the ovens are losing little time, the chief point being that they cannot accumulate the stocks that ought to be provided against the winter. A large quantity of coking coal must be moved to the head of the lakes, and when navigation closes the local situation will be better in that respect.

Coal operators are hopeful that full transportation facilities will be afforded during the winter, but doubt whether the railroads are entirely proof against bad weather. Car supplies in the past week have improved and the situation in this respect is rather satisfactory at the moment.

There is practically no open market activity and prices remain quotable at the set limits: Slack, $2.10; mine-run, $2.35; screen, $2.60, per net ton at mine, Pittsburgh district, with 15c. extra allowed to be charged by brokers.

BUFFALO

Bituminous market quiet. Coal moves more freely on account of more cars. Operators still anxious for greater output. Anthracite by lake good, locally scarce.

Bituminous—The supply seems to keep up, but the issue to shippers of a long list of concerns that are to have no more coal "till further notice" looks ominous. Still it is hoped that this is a further move toward caution and conservation. Besides, in many instances the prohibition is on account of these consumers having an overstock on hand. The shipper sees in it a still further cutting down of his business

and the jobber with no mine connection is in despair.

A further cause of uneasiness on the part of the jobber is the growing disposition of the consumer to order coal of the government zonal manager and ignore the jobbers entirely. Some jobbers find their business badly cut into from this source alone and all are afraid that taken all together the inroads will put an end to them. The move to allow the railroads to sell coal seems to the jobbers to be a direct effort to put them out of business.

Bituminous prices continue on Government basis, with little or no report now of deviation from them, as follows: Allegheny Valley thin vein, $4.65; Pittsburgh lump, $4.45; Pittsburgh mine run and slack, $4.20; smithing and smokeless, $5.85; cannel, $5.60 to $6.10, all per net ton, f.o.b. Buffalo.

Anthracite—The local shortage continues and is likely to till the lakes close, when it will be easy to fill the local trestles and keep the retailers busy till the cellars are all well stocked. It is hardly expected that the supply will come in fast enough at any time to provide full winter stocks, for Buffalo is too near the mines to make that a necessity, so the complaint of insufficient supply is likely to go on.

The lake trade keeps up well, though there does not seem to be any effort to gain on the shipments of last season. The amount loaded for the week was 114,600 net tons, of which 50,400 tons cleared for Duluth and Superior, 26,900 tons for Chicago, 9500 tons for Fort William, 7300 tons for Sheboygan, 6100 tons for Marouette, 5900 tons for Racine, 3000 tons for Houghton, 2800 tons for Sault and 2700 tons for Hancock.

CLEVELAND

Movement of bituminous to the Northwest is again slackening, and it is now doubtful if September shipments, scheduled for 4,900,000 tons, will much exceed 4,500,000 tons. Car supplies at No. 8 district mines in southern Ohio are reported better, but operators claim local draft boards are calling employees for examinations with no thought of production and in disobedience to General Crowder's instructions. Operations have been much impeded by this.

Bituminous—Production in the No. 8 district of southern Ohio shows a slight improvement over last week, due wholly to a better car supply. Labor is the most disquieting factor, and through no fault of its own. Local draft boards, operators complain, are calling some of the most important men for examination, and in some cases the enforced absence of a handful of men has thrown the entire mine out for the day.

Some railroad fuel continues to come east from Illinois and Indiana, but this is being offset by the shipment of railroad fuel from Ohio mines into Pittsburgh territory. The latest requisition for Ohio rail fuel to be moved east is for 300 cars. Instructions issued by D. F. Hurd, district representative of the Fuel Administration, requiring that orders accepted by operators from jobbers show the final consignee and destination, have been modified to the extent that they do not apply to shipments destined to Canada. The great bulk of Ohio coal continues to go to the lakes, and retail dealers are getting mightly little coal, not more than 15 to 20 per cent. of their requirements, at the most.

City officials of Cleveland have announced they have put away 3000 tons in the municipal coal pile, to be sold in quarter and half-ton lots later. Industrial stock piles continue to melt, and the burden of proof in seeking further supplies is put by operators squarely up to plant officials. The report of the Pittsburgh Vein Operators' Association of Ohio on car supply for the week ended Sept. 21 places the shortage at 13.46 per cent. The railroad rating of members reporting was 8638 cars, and they were supplied 7475. The loss in production, accordingly, is placed at 58,150 tons. Car supply on the Pennsylvania R. R. shows steady improvement. In the week ended Sept. 14 car supply was 15.47 per cent. short, showing an improvement of 2 per cent. The latest report on shipments by association members is for the week ended Sept. 14, when the total carloads was 4969, compared with 4408 carloads the first week preceding and 8876 carloads the second. The movement in the week ended Sept. 14 was 554 cars of railroad fuel, 3011 to the Great Lakes, 1137 to Ohio, 111 to Michigan and Indiana, and 156 to Canada.

Lake Trade—Operators now fear that 4,500,000 tons will be the best they can do for the Northwest in the way of bituminous coal in September. Shipments so far this month hover around the 1,100,000 tons a week mark, those for the week ended Sept. 21 being estimated at 1,095,353 tons, not including vessel fuel. The Great Lakes fleet lost several days early in the week through rough weather on Lake Superior, and the supply at the Lake Erie docks has been somewhat lower than usual. The Northwest is beginning to complain to operators, for with each succeeding week the opportunity of recovering the tonnage lost earlier in the season diminishes. If September falls the expected 400,000 tons behind the Fuel Administration's schedule, the shortage for the lake trade to Oct. 1 will again top the 1,000,000 ton mark.

DETROIT

Jobbers find it difficult to do business under the modified zone regulation. Scarcity of domestic coal continues. Lake shipments are large.

Bituminous—Limitations becoming effective under the recent order of the Federal Fuel Administration, reserving West Virginia coal for use of gas and byproduct plants, railroads and domestic consumers, have placed a new handicap on their business, Detroit jobbers say. The West Virginia mine-run and slack are now being withheld from the industrial consumers that formerly absorbed the greater bulk of this coal coming to the Detroit market. As the territory served by the local jobbers does not include enough railroads, gas works and byproduct plants to constitute an extensive market, the jobbers must place their chief reliance on retailers supplying domestic trade. The retailers are able to handle only a moderate amount of the stock.

The steam plants that have been using West Virginia coal for years are now permitted to purchase only coal from Indiana or from Illinois,, which is described as a very unsatisfactory substitute. Some of the industrial plants rather than take chances with coal from the new districts are said to be providing for current needs from reserves they had planned to hold for winter protection.

Anthracite—Detroit's supply of anthracite is still short and is not being increased in a way to reassure the anxious domestic consumers, who are obliged to have recourse to that form of fuel. Shipments arriving this month will scarcely average 1500 tons a day. At that rate of delivery it is calculated nearly 60 days will be required to provide baseburner owners with a start on winter supply.

Lake Trade—Coal is moving over the lake routes in substantial volume and shipments for the month are likely to pass the 4,000,000 ton mark. Growing demands of the grain trade are expected soon to cause a diversion of some carriers that have been available for coal cargoes.

COLUMBUS

The coal trade in Ohio territory continues firm in every respect with the possible exception of screenings, which are coming in rapidly. Domestic and steam tonnage is in strong demand and extra efforts are being made to ship a larger tonnage to the Northwest.

There is still a little softness in screenings, due to the continuation of the embargo against small sizes being shipped into Michigan, which was one of the big markets for that grade. But other steam users, relieved from their limitation on storage, have been gradually absorbing the extra tonnage of screenings and the situation is well in hand.

Domestic trade is now attracting attention of coal men and fuel administrators alike. Dealers have been busy delivering fuel and reports show that fully 65 to 70 per cent. of householders in Columbus and immediate vicinity are provided. Orders are coming in fast, although dealers are not rushed as was the case earlier in the season. Retail prices are firm at former levels. Anthracite as well as Pocahontas is now out of the market entirely. Domestic coke is in good demand. Considerable West Virginia splint is offered as there is a considerable tonnage arriving in this section. The main supply of coal for domestic purposes comes from the Hocking Valley and Pomeroy mines.

The steam trade is rather quiet as reserve stocks are now pretty fair and there is no immediate urgency for shipments.

The lake trade is active and especial efforts are put forth to supply the Northwest as early as possible. As a result lake traffic is being speeded up to a high pitch. Little time is lost in loading and unloading, and the ore movement is good. Car shortage on some of the coal carrying lines is having an effect to reduce the lake tonnage.

Prices on short tons f.o.b. mines are as follows:

	Hocking Thin Vein	Hocking Thick Vein	Pomeroy	Eastern Ohio
Sized grades	$3.00	$2.75	$3.00	$2.60
Mine-run	2.75	2.50	2.75	2.35
Screenings	2.50	2.25	2.50	2.10

CINCINNATI

With a fair car supply, coal movement is well maintained, and some reserves are being accumulated. Proper distribution under priority rules is the chief difficulty of the trade.

With a continuance of cool weather, which has come a trifle early, and the beginning of actual consumption of coal for heating purposes by domestic consumers, hotels, office buildings and others, the season has really begun. Industrial operations also tend naturally to increase in activity and volume as the fall and winter progress, and this also increases coal consumption. The practical application of the priority orders of the Fuel Administration to the distribution of coal is beginning to worry jobbers and operators considerably, especially considered in connection with the operation of the zone system, which has thrown the usual channels of distribution into the discard in favor of the short haul. For instance, there has as yet been very little coal from western Kentucky or Indiana on this market, and that which has arrived has been the cause of considerable dissatisfaction. In the sections close to these fields, where consumers are accustomed to the coal, it is used as a matter of course; but it is much inferior to the fuels from West Virginia and eastern Kentucky to which industrial consumers in and around Cincinnati are accustomed, and as the latter fields are considerably closer to this market than those of Indiana and western Kentucky, the freight rate makes the latter coals cost virtually as much as the better fuel. However, the fact that there is objection to these low-grade fuels indicates in itself that the pressure of actual scarcity has not yet been felt. There may be another story when it is a question of using cheap coal or going without.

LOUISVILLE

Screenings, nut and slack and all steam coals are a little draggy at the present time, while the demand for domestic sizes is somewhat better than it was last week. Domestic coal is scarce on this market, most of the retailers being short of stock.

According to local jobbers, retailers and mine operating concerns, there is a general scarcity of domestic coal this week, with supplies of both eastern and western Kentucky grades scarce. A week ago there was a slight surplus of domestic coal in most of the yards, but this has been cut down by cool weather and a good demand for small lots. Eastern Kentucky screenings are a little draggy, with mine-run fair, while lump is scarce. However, eastern Kentucky coal has been arriving on the local market better than it was.

Under new regulations southeastern Kentucky steam coal is only going into Michigan on permits, while domestic coal is being shipped to that state freely. The mines of the district are being handicapped in disposing of nut and slack under the 30 day provisions, which in the present case should be lifted in order to establish a better market.

Eastern Kentucky has a fair supply of labor and is getting a 60 to 75 per cent. car supply. The larger part of the Blue Gem coal from Kentucky fields is now moving south to the textile districts. Harlan coal is moving to the Lakes and Michigan district. Elkhorn coal is going to the steam and byproducts plants, and Hazard coal is moving to the lakes and almost every district except the south. Western Kentucky coal is moving into Kentucky and Tennessee only. Movement of the latter coal for Kentucky consumption will be considerably reduced when the Federal powder plant at Nashville is running full blast, it being said that about 7000 tons a day will be required there.

Some little Indiana coal is moving into Louisville for use of industries located on the terminals of the Kentucky & Indiana Bridge and Terminal Railroad Co., and retailers are securing some of this coal when unable to secure supplies of western or eastern Kentucky grades. The western Kentucky field is much handicapped at this time on account of shortage of labor, and a 30 to 40 per cent. car supply.

BIRMINGHAM

Steam trade good but easy. Domestic sizes scarce, with strong demand. Car supply fairly good. Labor conditions unchanged.

The trade remains easy as regards steam grades. There are sufficient inquiries and orders in hand to prevent any accumulation at the mines, however, and coal is moving to consumers steadily. The railroads as a whole have a limited supply of fuel in their chutes, and some complaint of shortage came from lines operating in Georgia during the past week.

The domestic market continues to show

great strength and the several days of cool weather the past week boosted the order files of dealers considerably. Receipts are not commensurate with the requirements of the trade, but are as good as or better than the normal record for this season of the year.

The figures of Representative Holmes, of the Fuel Administration, for the week ending Sept. 14, show a production of 385,621 net tons, the lowest weekly output since June. Paydays and registration hampered operations to some extent, while on other days labor worked very irregularly.

Coke

CONNELLSVILLE

Attention to coke quality. More by-product ovens at Clairton. Less foundry and more furnace coke.

Greater stress continues to be laid upon quality of coke than quantity, the testimony of blast furnaces continuing to be that it is quality of coke rather than shortage in supply that is restricting the output of pig iron. The Fuel Administration is inspecting the coke produced at different works in rotation, and through the medium of public meetings is seeking to arouse operators and miners to an appreciation of the importance of producing good coke. The case is put flatly, that the more steel is supplied the more lives of soldiers will be saved, and the better the coke the more pig iron will be made and consequently the more steel.

The output of beehive coke and of raw coal of the Connellsville region shows no material change from week to week. Output is restricted chiefly by mining conditions, car shortage being only occasionally in evidence.

The Carnegie Steel Co. last week put in operation the seventh 64-oven battery of byproduct ovens at the Clairton plant, and the remaining three are expected to be in operation by Nov. 1. The ovens are working on 19-hour coking time, which means 1000 tons of coal per battery per day, the coke yield being about 650 tons. Except for some Pittsburgh district coal furnished by the Fuel Administration occasionally as it can be found, the ovens are operating on high volatile coal from the lower Connellsville region, which accounts for the 65 per cent. yield indicated, the object being to produce as much sulphate of ammonia and toluol as possible. The old basin runs 30 per cent. and less volatile, and coke requirements in the case of Clairton are subsidiary to byproduct requirements.

Offerings of foundry coke in the market are less than formerly, the Fuel Administration having attended to a number of cases of 72-hour coke being offered as foundry grade when it was not urgently needed, and requiring that the coke be furnished to blast furnaces. Essential foundry needs are well taken care of, and the brokers are still able to pick up a carload or so at a time and get a 25c. commission from the operator for disposing of it. Furnace coke scarcely ever reaches the open market, for if any surplus develops the Fuel Administration generally finds it first. The market remains quotable at the set limits; Furnace, $6; foundry, 72-hour selected, $7; crushed, over 2-in., $7.30; clean screenings from old dumps, over 1-in., $5.50, all per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Sept. 21 at 339,475 tons of coke, a decrease of 8855 tons, and 222,403 tons of coal for shipment, an increase of 6219 tons.

Buffalo—The market is steady, but without recent change. Furnaces are getting what they need by dint of old arrangements and the rather liberal amount of byproduct coke that is produced here. With a third plant, now under construction, the local furnaces ought to be well supplied. Breeze coke is active, most of it selling at government prices, though some cutting of the very fine product is reported. The ore movement keeps up, receipts by lake for the week being 335,550 gross tons. Harry Coulby, chairman of the mobilization committee of Cleveland, has issued a note to vessel owners urging them to keep their craft moving as rapidly as possible, as the ore, coal and grain to be moved yet this fall will require all available tonnage.

Middle Western

GENERAL REVIEW

Operating conditions favorable, with car supply excellent. Higher grade southern Illinois coals, both steam and domestic, remain firm. Coal from other districts selling under Government price.

Operating conditions are continuing favorable to the producers. For the past week the car supply has been excellent; so good, in fact, that a few of the larger coal-carrying railroads have loaned cars to their less fortunate competitors, with the result that practically all the mines in the mid-Western field have been supplied with as many cars as they could load.

Labor appears to be steady, and while there is no great supply of men to draw on, the mines are not closing down through lack of labor. So far as the Middle West is concerned, the labor supply is better than it has been for some time past, and is likely to continue good. There are, however, isolated cases of mines suffering from a man shortage, but these cases are too few and rare to make much real difference in the Mid-West territory, considered as a unit.

As usual, the higher grade coals of southern Illinois remain firm, both in steam and domestic sizes, but practically all other coal from the producing districts of Indiana and Illinois may be purchased under the Government price. This is more especially noticeable in steam, rather than domestic sizes.

In addition, this weak state of the present market will continue just as long as operating conditions prove favorable, or until such time as the Fuel Administration sees fit to enlarge the zone, so that the Illinois and Indiana operators may market their coal outside of the present fixed territory, which is proving not extensive enough to absorb the coal being produced.

CHICAGO

Little interest shown in steam coals, as many plants have sufficient fuel on hand to run from two to three months. Domestic market in better condition.

There has been little interest shown during the past week by the large purchasers of steam coal. Those that buy regularly, on the open market, are placing their orders as usual, only at a substantial reduction from the Government price.

To size up the situation, the coal-buying public is not much interested in coal just now. There are a number of reasons for this, chief among which is the fact that the average steam plant has sufficient coal in storage to run from eight to twelve weeks.

The domestic market is in somewhat better condition. The recent rule of the State Fuel Administration, that no anthracite be burned until Christmas, has forced a number of householders, who had already been fortunate enough to get hard coal, into the market to purchase some bituminous.

MILWAUKEE

Rumor that all Lake Michigan coal-receiving ports will soon be embargoed. Shortage of labor seriously hampering deliveries.

Lake receipts of coal are slacking up some, and a rumor is afloat that all Lake Michigan ports will soon be wholly or partly embargoed. Vessel masters who bring the story from the lower lake docks are inclined to credit it. The Reiss Coal Co., which maintains docks at Waukegan, Ill., and other lake ports, has been directed by the Government to cease taking in coal at Waukegan. As the naval station at Great Lakes, near by, relies upon the Waukegan supply for kitchens and hospitals, and as scores of homes are without fuel, the people in these places are naturally greatly disturbed over the order.

State Fuel Administrator Fitzgerald considers the coal outlook for the winter in this district favorable. He says not quite as much anthracite is on the docks as at this time last year, but the amount of bituminous in stock is greater. However, if the lake supply should be curtailed or cut off altogether, there would be a different aspect to the situation.

Receipts of coal by lake at Milwaukee thus far in September include 171,700 tons of anthracite and 160,600 tons of bituminous, making the season's receipts of hard coal up to the time of this report 443,905 tons, and of soft coal 2,655,532 tons.

Hard coal is being dealt out sparingly to the smaller dealers in Milwaukee, and as a consequence many homes still remain unsupplied. If this condition of things does not change soon many consumers will have to substitute soft coal or go without fuel. A shortage of labor is also hampering deliveries. One firm alone recently purchased 20 trucks, half of which are still awaiting their first loads.

West Allis, a suburb of Milwaukee, has only a small portion of 30,000 tons necessary to tide homes and factories over the winter, and the authorities and factory proprietors have petitioned the Government for relief. Some of the factories are engaged in war work.

The city authorities will sell coal to needy people during the coming winter at cost. The distribution will be made from the various fire engine houses and ward lots.

Fire is raging in the City Fuel Co.'s yard at Manistique, Mich., in the Green Bay district, and many tons of coal have already been destroyed.

ST. LOUIS

A quiet, easy market as far as demand is concerned, with a surplus of all sizes excepting Carterville grades. Production not heavy. Cars are plentiful and transportation good. Demand seems to ease up everywhere locally.

The St. Louis market continues easy. There is no demand for anything but the Carterville grades. This is especially noticeable in domestic. The retail demand for coal has fallen off to a remarkable extent in the last ten days and a survey of the retail situation develops the fact that dealers have enough orders on their books now for from one to two weeks ahead and the bulk of this business is for Carterville coal, which cannot be secured. As a rule there is not more than a couple of days supply of orders for Standard and Mt. Olive on hand.

The domestic demand in the country is in somewhat the same condition. Plenty of Carterville orders and no Carterville coal, and a reasonably good supply of Standard and Mt. Olive coal but no orders for those grades. With the first touch of real cold weather, however, business will develop on these coals. The weather here for the past two weeks has been unusually cool for this period, but not sufficiently so to develop any business.

On steam coals the conditions are reversed. There is no demand for Carterville steam coals, as these find a ready market in the north.

The demand for the Standard and Mt. Olive steam sizes, however, is very weak, and it is being continually limited. The price of screenings is far below the Government maximum, and in a manner, this has retarded the development of a big tonnage and caused the forcing of the market on these sizes.

There still continues to be a surplus of coal in both the Mt. Olive and Standard fields, with no available market. This does not refer to steam sizes only, as there is a large tonnage of domestic sizes unbilled nearly every day.

The car supply has been better throughout the Standard field the past week and transportation shows up fairly well, but the tonnage is not increased on account of county fairs, which seem to be hitting southern Illinois generally at this particular time. In the Mt. Olive district car supply is better than usual and this field continues to have considerable time placing their tonnage.

In the Carterville and Duquoin fields some improvement has been noted the past week, but not to any great extent. Car shortage continues in this field and transportation has shown little improvement. The railroad tonnage from this field still continues large, and little of the coal moves into this territory. After the first of the month a better tonnage is expected to come along.

The railroad tonnage throughout the Mt. Olive and Standard field still continues good, and were it not for the railroad coal that is moving these mines would be working only half of the time on account of no market in which to place their coal. It is figured at the present time that over 85 per cent. of the coal that is usually in by Dec. 1, is now stored in the homes in St. Louis, and the tonnage may be greater than that.

There are no eastern coals coming in. A small tonnage of Arkansas anthracite and semi-anthracite comes in when loaded in equipment that must come this way. Coke is getting scarce and very little to offer for carload shipments.

The prevailing market per net ton f.o.b. mines is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump..	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg..	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut..	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1.....	3.05@3.20	3.05@3.20	.....
No. 2.....	3.05@3.20	3.05@3.20	.....
No. 3.....	3.05@3.20	3.05@3.20	.....
Mine Run..	2.35@2.50	2.35@2.50	2.20@2.30
Screenings..	2.17@2.32	2.17@2.32	1.50@1.60

Special preparation on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Current	One Month Ago	One Year Ago
$4–5	$4–5	$3.60

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

	Current	One Month Ago	One Year Ago
CINCINNATI			
No. 2 Southern foundry	$36.60	$36.90	$49.90
No. 2 Northern foundry	.....	36.26	56.20
NEW YORK †			
No. 2 X Northern foundry	34.40	34.40	54.25
No. 2 plain Northern foundry	33.90	33.90	53.75
No. 2 Southern foundry	40.70	39.00	52.75
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	47.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	55.00
No. 2 Southern foundry	38.00	38.00	.....
PITTSBURGH			
Bessemer iron *	36.60	36.60	55.95
Basic iron *	32.00	32.00	53.00

* These prices include the freight charge from the valley to the Pittsburgh district. † Delivered Tidewater, New York.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	New York—Current	New York—One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.245	$5.25	$4.27	$4.27
Channels, 3 to 15 in.	3.00	4.245	5.25	4.27	4.27
Angles, 3 to 6 in., ¼ in. thick	3.00	4.245	5.25	4.27	4.27
Tees, 3 in. and larger	3.05	4.245	5.30	4.27	4.27
Plates	3.225	4.745	9.00	4.52	4.52

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.50	4.24	4.85	4.475

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.50	$5.05	$4.32	$4.75	$5.95	$4.75
Cut	4.00	5.50	.....	4.47	....	6.40	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$6.00	$4.50	$5.30	$6.70	$6.00	$5.30
Track bolts	4.90	8.90	5.50	Prem.	8.00	8.00	6.30
Standard section angle bars	3.25	....	4.45	Prem.	5.15	....	4.85

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+15%	+40%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7.00	$6.50	$6.25	$8.00	$7.25
Assorted	5.90	7.00	6.50–7.00	6.40	8.25	7.50

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York—Current	New York—1-Month Ago	New York—One Year Ago	Chicago	St. Louis	San Francisco
4 in.	$64.35	$64.35	$68.50	$64.80	$63.00	$80.50
6 in. and over	61.35	61.35	65.50	61.80	60.00	77.50

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh—Current	Pittsburgh—One Year Ago	Chicago—Current	Chicago—One Year Ago
Standard Bessemer rails	$57.00	$38.00	$67.00	$38.00
Standard openhearth rails	55.00	40.00	65.00	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	83.00	*3.135 (100 lb.)	68.00
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	82.00	*3.09 (100 lb.)	67.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	75.00	*3.00 (100 lb.)	65.00

* Government price per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$30.80	$31.00	$34.00
Stove plate	26.50	25.00	19.00
No. 1 machinery cast	34.00	29.50	21.50
Machine shop turnings	16.25	17.00	19.00
Cast borings	16.25	17.10	18.50
Railroad malleable cast	31.20	29.00	25.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.19	$0.17½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c.	16c.	15c.
Hollow	24c.	....	....

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Steel Black	Steel Galvanized	Iron Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	44%	17%	⅜ to 1½	33%	17%
½	48%	33½%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD. EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	⅜ to 1½	33%	18%
½	45%	36½%			
¾ to 1½	49%	36½%			

LAP WELD. EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black—New York	Black—Chicago	Black—St. Louis
⅜ to 3 in. butt welded	33%	43%	37%
3½ to 6 in. lap welded	15%	39%	33%

	Galvanized—New York	Galvanized—Chicago	Galvanized—St. Louis
⅜ to 3 in. butt welded	16%	28%	22%
3½ to 6 in. butt welded	+3	25%	19%

Malleable fittings. Class B and C, from New York stock sell at list price Cast iron, standard sizes, 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York—Current	New York—One Year Ago	Cleveland—Current	Cleveland—One Year Ago	Chicago—Current	Chicago—One Year Ago
Hot pressed square	$2.50*	List	$1.25	$1.65	$1.05	$2.00
Hot pressed hexagon	2.50*	List	1.05	1.50	.85	2.00
Cold punched square	2.50*	List	.75	1.25	1.00	1.50
Cold punched hexagon	2.50*	List	.75	1.25	1.00	1.50

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	40%	50%
Chicago	50%	45%
Cleveland	50–10%	50%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	30%	40–10%	37%
Larger and longer up to 1 in. by 30 in.	15%	20–5%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..... $2.50 Cleveland..... $1.00 Chicago..... $2.50

For cast-iron washers the base price per 100 lb. is as follows:

New York..... $5.00 Cleveland..... $4.00 Chicago..... $3.50

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	30%	45—5%	37%*
Tinned	15%	20+5%	25—5%*

Button heads, ½, ⅝, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:

New York..$5.65 Cleveland...$5.15 Chicago....$5.67 Pittsburgh...$4.65

Coneheads, same sizes:

New York..$5.75 Cleveland...$5.25 Chicago....$5.77 Pittsburgh..$4.75

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	7	8½	12½
Fiber or sponge	8	....	8½	20
Transmission	7	7	9	20
Axle	4½	4	3½	5½
Gear	4½	....	8½	9
Car journal	22 (gal.)	....	5	8½

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	95.00	70.00	93.00	70.00	96.00	70.00
Commercial	50.00	40.00	23.00	24.50	25.00	25.00

HOSE—Following are prices of various classes of hose:

Fire	50-Ft. Lengths
Underwriters' 2½-in	75c. per ft.
Common, 2½-in	40%

Air	First Grade	Second Grade	Third Grade
¾-in. per ft	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade....30% Second grade....30–5% Third grade....40–10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	28%	35%
Denver	35–5%	30%
Birmingham	35%	35%
Chicago	45%	40%
Cincinnati	40–10%	40%

RAWHIDE LACING—35% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.99
Asbestos for high-pressure steam	1.76
Duck and rubber for piston packing	1.10
Flax, regular	.99
Flax, waterproofed	1.21
Compressed asbestos sheet	1.10
Wire insertion asbestos sheet	1.30
Rubber sheet	.66
Rubber sheet, wire insertion	.99
Rubber sheet, duck insertion	.55
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.21
Asbestos wick, ½- and 1-lb. balls	.75

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

MANILA ROPE—For rope smaller than ¾-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ¼-in., 8 ft.; ⅜-in., 6; ½-in., 4½; 1 in., 3½; 1¼-in., 2 ft. 10 in.; 1½-in., 2 ft. 4 in. Following is price per pound for ¾-in. and larger, in 1200-ft. coils:

Boston	$0.33½	Birmingham	$0.39
New York	.36	Denver	.35½
Cincinnati	.33½	Kansas City	.34
Chicago	.34	Seattle	.34
St. Paul	.34	St. Louis	.33
San Francisco	.32	Los Angeles	.35

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING		BLOCKS AND SHEETS	
Pipe Size	Standard List Per Lin. Ft.	Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1 -in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2 -in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3 -in.	.90
10-in.	1.30	3½-in.	1.05

85% magnesia high pressure ..... List

For low-pressure heating and return lines ..... 4-ply..... 58% off; 3-ply..... 60% off; 2-ply..... 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.90	$1.26	$2.10	$1.30	$2.05	$1.20
5-gal. cans	2.00	1.36	2.25	1.40	2.25	1.30

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Current		1 Year Ago		Current	1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	14.00	14.50	13.25	13.50	14.00	13.00
25 and 50-lb. kegs	14.25	14.75	13.50	13.75	14.25	13.25
12½-lb. keg	14.50	15.00	13.75	14.00	14.50	13.50
5-lb. cans	.....	.....	15.25	15.50	16.00	15.50
1-lb. cans	.....	.....	.....	.....	17.00	.....

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$16.75	Birmingham	$15.00
St. Louis	10.00	Denver	9.50

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ⅙ lb. rolls	38c. per lb.
Rubber tape, ½-lb. rolls	45c. per lb.
Wire solder, 50-lb. pools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L. C.l.	C.l.	L.C.l.	C.l.	L.Cl.
No. 1 grade	$1.33	$1.60	$1.70	$1.95	$2.05	$2.30
No. 2 grade	1.20	1.15	1.50	1.75	1.80	2.05

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs per $2.20 roll in carload lots and $2.45 for smaller quantities.

Shingles, red and green slate finish cost $5.50 per square in carloads, $5.75 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less than Carload Lots
Tarfelt (14 lb. per square of 100 sq. ft.)	$64.00	$65.00
Tar pitch (in 400-lb. bbl.)	21.00	22.00
Asphalt pitch (in barrels)	40.00	45.50
Asphalt felt	72.50	77.00

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	New York Current	Factory Perth Amboy, N. J.	Chicago	St. Louis	San Francisco	Dallas
4x12x12	$0.1025*	.....	$0.07	$0.07	$0.1125	$0.1032
6x12x12	.1350*	$0.1512	.095	.10	.15	.1444
8x12x12	.....	.1836	.12	.14	.....	.1856
10x12x12	.....	.216	.14	.17	.....	.2064
12x12x12	.....	.27	.195	.20	.....	.2888

*Partition tile

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$21—37.05	$23.00—24.50	$26.00
Birmingham	33.00	33.00	28 50
Denver	43.25	35.00	43.00
Cincinnati	45.00	44.00	39.00

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill, in Carloads	New York			Cleveland		Chicago	
		Current	One Month Ago	One Year Ago	Current	One Year Ago	Current	One Year Ago
*No. 28 black	5.00	6.495	6.445	10.00	6.42	9.50	6.52	9.50
*No. 26 black	4.90	6.395	6.345	9.90	6.32	9.40	6.42	9.40
*Nos. 22 and 24 black	4.85	6.345	6.295	9.85	6.27	9.35	6.37	9.35
Nos. 18 and 20 black	4.80	6.295	6.245	9.80	6.22	9.30	6.32	9.30
No. 16 blue annealed	4.45	5.695	5.645	9.70	5.62	9.70	5.72	9.70
No. 14 blue annealed	4.35	5.595	5.545	9.60	5.52	9.60	5.62	9.60
No. 10 blue annealed	4.25	5.495	5.445	9.50	5.42	9.50	5.52	9.50
*No. 28 galvanized	6.25	7.745	7.695	13.00	7.67	11.00	7.77	11.00
*No. 26 galvanized	5.95	7.445	7.395	12.70	7.37	10.70	7.32	10.70
No. 24 galvanized	5.80	7.295	7.245	12.55	7.22	10.55	7.47	10.55

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 5c., all gages

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$15.00	$20.00	$35.00	$12.50	$15.50	$33.50	$13.00	$17.40	$36.80
10	25.65	28.90	57.45	27.20	31.00	63.00	21.40	24.40	42 75
8	36.45	40.25	80.30	38.00	42.00	78.00	42.35	44.35	.....
6	57.40	61.70	.....	.....	65.00	130.00	64.60	74.60	.....
4	83.40	88.70	.....	.....	93.00	.....	101.75	106.05	.....
2	126.60	132.80	.....	.....	140.00	.....	151.50	163.00	.....
1	164.15	172.40	.....	.....	182.00	.....	201.00	208.50	.....
0	206.80	206.80	.....	.....	242.00	.....	276.00	285.00	.....
00	278.80	278.80	.....	.....	290.00	.....	317.00	330.00	.....
000	341.65	341.65	.....	.....	360.00	.....	417.00	428.50	.....
0000	417.05	417.05	.....	.....	435.00	.....	516.00	516.00	.....

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing	Gelatin			Black Powder
	20%	40%	60%	80%	
New York	.....	$0.28½	$0.35½	.....	$2.50
Boston	$0.25½	.28½	.35½	$0.42½	2.65
Cincinnati	.19½	.23½	.29½	.....	2.45
Kansas City	.21½	.27½	.34½	.44½	2.55
New Orleans	.21½	.28½	.35½	.45½	2.70
Seattle	.....	.25½	.32½	.....	.....
Chicago	.19½	.23½	.34	.44	2.45
St. Paul	.20	.27½	.34½	.....	2.55
St. Louis	.20	.27½	.34½	.44½	2.35
Denver	.18½	.26	.33	.43	2.50
Dallas	.24	.31½	.38½	.48½	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.27	New Orleans	$0.38½
Buffalo	.17	New York	.24½
Chicago	.27	Philadelphia	.23
Cincinnati	.23	St. Louis	.34
Cleveland	.17	St. Paul	.40½
Denver	.99	Pacific Coast (all rail)	1.25
Kansas City	.59		

Note—Add 3% transportation tax.